The continuation of *CoEvolution Quarterly* and *Whole Earth Software Review*

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WHOLE EARTH Review

All panaceas become poison

COMPUTERS AS POISON

Also: Whole Earth Software Catalog Update

THE MONKEY TRAP OR THE MYSTICAL ENGINE?

by Birrell Walsh

Illustrated by Jim Ludtke

Self-confessed computer junkie Birrell Walsh had his wife hide his telecommunication modem to save money. Away from his computer Birrell is the sound technician for KQED, the San Francisco public TV station. Jim Ludtke, air-brush artist, freelances in New York.

—Kevin Kelly

TO THOSE WHO DON'T LIKE COMPUTERS, these machines seem to be a kind of monkey trap — a bottle with fruit in it. The monkey reaches in and grasps the fruit, but with the fruit in his fist he cannot get his hand out. The hunter catches him because the monkey is unwilling to let go of the fruit.

It is not our hand that we put into the computer, it is our attention. Anyone who has watched the back of a mate or child bent before a computer for hours can tell you: These machines hold attention like no prior machine.

To those of us who love these machines, they are a portal into another, fascinating universe. It is a puzzle-world, full of possibilities. The beautiful patterns on the screen are just the two-dimensional shadows cast by the goings-on in the "informational world." We agree we are absorbed. We would class this absorption as ecstasy.

These, then, are two interpretations.

- The computer is a monkey trap for intelligent monkeys.
- The computer is a mystical engine.

It is not our hand that we put into the computer, it is our attention

How does the monkey trap work? It is a matter of obsession. Traditionally, "obsession" meant "a siege," this condition in which one was held in by the very walls one had built for security. The city where one found comfort and a living became the cage in which one was trapped. "Obsession" also meant possession by a spirit. An invisible power leapt from its hiding place and replaced the human soul. New and undesired behavior followed.

When a computer comes into a human life and obsesses it, those around will observe both these meanings. It is as if the person has become addicted to a new drug. The computer junkie falls away from old social relations and becomes immured with a small, glowing screen.

He told his friends that the computer was going to open up his life, but it seems to have closed his life. He has disappeared within the walls and shut his gates. All his thoughts and dealings seem to circle around this new spirit, in the center of a closed city.

This is the view from outside.

From within the obsession, one sees the other face of the machine — the computer as mystical engine. The computer allows, for the first time, the manipulation of almost pure information. Before, information was an ore, buried in life, in books, in tables and patterns.

Now it is here, purified.

How many fond of wine could resist its distillate, brandy? The spirit in the computer is like the spirit in brandy. It addicts not only individuals, but cultures. It promises "easy control over complex operations," "instant access to detailed records," "no more time-consuming redrafting and retyping," "twice the productivity and half the labor cost."

Good morning, Mephistopheles!

The computer promises more than power in this world. It offers a world of its own. Database designers talk about "navigating" in the database. Computer terms are full of spatial metaphors: "architecture," "addresses," "pointers," and "jumps." After working with a computer for a while we come to feel that it actually is the door into another spatial world, a world where we can have and do anything if only we can figure out how and find the path. At first we falter. Then we gain confidence and explore further.

Without being conscious of it, we experience a transposition: Before, computing was an entity in our world; now, we are entities in the computer's world.

To the pathfinder in the information-world, the computer is a *door* to that other world, but to the outsider, it seems that the computer junkie has fallen into the machine. The monkey is entirely in the bottle. The outsider does not agree that there is another world in that direction.

If obsession is the problem, what might be an antidote for this obsession?

The monkey must learn to let go as well as to grasp, for it is characteristic of our culture that it more often teaches us to grasp than to let go.

Fortunately, we know some ways to de-obsess. Humor works. The only way we can laugh about anything is to move momentarily outside of it and see it differently. That step outward is a release and an escape. It may not last, but it establishes that there *is* an outer world. Another escape is a rival obsession. Here it is that one's vices may serve better than one's virtues. There is nothing like lust, laziness, anger, greed and gluttony to get one out of a mystical vision. Far the worst deliverance is by a trained *a priori* cynicism: "Nothing is worth obsession." (That is a cure only as celibacy is a cure for VD.)

More interesting than any of these, save humor, is the attempt to make practical the visions seen in information-space. To attempt to make something practical is a bridge-building business. The bridge builder values what is found at both ends of the bridge. To make something practical is to say both that the vision is valuable and that the outer world is valuable. It says that the monkey's fruit is valuable — but not while it is in the bottle.

So the attempt to use computers practically can be a specific antidote to computer obsession. One's thoughts must move back and forth between the information-world and the outer world where one's applications and purposes lie. These goals must be worthy, lest the new demon be worse than the old.

A computer can be a gate to mystical experience. That experience can lead to obsession. Humor, vice and the attempt to manifest vision can break the obsession, and the monkey can get away with his dinner. ■

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METAL LUNCH

by Don P. Mitchell

[Robots work at an assembly line viewed through transparent gears and works. Toaster ovens roll by on the belt. One robot sparks and stops working, but the others do not notice. Robot heads are blank metal ellipsoids.]

Narrator: *(speaking rather tonelessly)*
How do you measure value? By the price tag? By the need? By the blood and sweat that go into making something? Robots do not produce labor value, though. They are not part of the social contract. There is no mechanical Karl Marx to save them.

[Robot leans against a lamp post smoking a cigarette. Another robot walks by and stops. They walk off together into the black background.]

Narrator:
Robots don't reproduce sexually. They can't even come. Even so, many of them engage in copulation. No one knows why, but everyone agrees it is very unwholesome. Perhaps it is done as satire.

[Robot sitting in an alley against a brick wall. It pushes a metal probe into an open access panel in its arm. Camera switches to shot looking down from directly overhead.]

Narrator:
Robots have primitive concepts of reward and punishment to allow easy programming. Some robots become junkies by searching for wires leading to their pleasure center and applying high voltage to them. This is called "back planing" and eventually destroys the robot's electronic control system.

[Robot riveted to a cross made of steel "I" beams. Above it is a Latin inscription: "Sic Biscuitus Disintegratum." Camera is in front and above the robot as in Dali's painting of the Crucifixion.]

Narrator:
Robots have a cold, metallic religion that offers no sympathy. They worship primitive mechanical archetypes: The Screw, The Lever, The Inclined Plane.

[Back to original scene of robots at assembly line. One suddenly shoots itself in the head. Immediately, its head is replaced with a new one and the robot goes back to work.]

Narrator:
Occasionally, a robot is overcome by hopelessness and existential ennui, but there is no escape.

Don P. Mitchell, author (whereabouts unknown), and Paul Rubin, suggestor (no return address), are both as faceless to us as the robots above. Please come forward for credit.
—Kevin Kelly

BITING THE HAND THAT FEEDS

Ungrateful wretches criticize munificent benefactor

by Stewart Brand

Our favorite adage, "All panaceas become poison," has two insidious components . . .

1) Anything treated as a cure-all eventually will create new ailments for which it has no cure.

2) The question of dosage. When we were kids my older brother Mike swallowed an entire bottle of vitamin pills in the hope that they would make him strong as Superman. He slept for three days straight and scared the family to death.

For the last couple years computers, especially personal computers, have been touted as the bearer of salvation for:

Children	Householders	The American economy
Students	Bored people	The world economy
Job-seekers	Businesspeople	. . . among others

And we bought it. And significant salvation occurred. Now that we've been saved, it's not too early to inquire about the real price.

When automobiles first began to appear, we were informed by enthusiasts that at last the American city would be clean (no more horseshit), quiet (no more clop clop clop), and safe (no more runaway horses). True, so far as it went. But who predicted smog, motorcycle roar, and the routine carnage of auto accidents? (How many of your friends have beem maimed, traumatized, killed by the handy automobile? Let that number be the only statistic in this introduction.)

I'm shy of numbers here, because I'm aware of how readily computers numeralize our lives to a lowest common denominator. Buying into the convenience of using the machines, we also buy into their trivialization, living increasingly on their terms at *their* convenience. They're not evil, just fast dumb number crunchers, and it's catching.

The convenience itself hides problems. A physicist friend, Robert Fuller, deplores the effect of computers on scientific theory. "There's no need to be elegant. With a powerful enough computer and a clumsy theory, you can crunch through the approximations and still get a useable result. I wonder if the major theoretical breakthroughs in physics of the '30s and '40s would have happened if computers had been around to disguise the problems in the previous theories."

Misgivings, grave doubts, ambivalent miseries abound on this subject, but they're not given much press or notice these days. All the usually reliable liberal critics have Kaypros and WORDSTAR and pride in their new computer skills, and they're hushed. The remaining hippies who didn't get rich with rock & roll or with drugs are too busy getting rich with computers to make any fuss. Politically, economically, high tech is a motherhood issue (zero controversy). Especially now that things are a little troubled in the computer biz, DON'T MAKE WAVES.

Bad sign.

With some glee, here are as many waves as we could muster in a few months. We'd like to see more, along with debate of what's here. Since this first issue of *Whole Earth Review* represents the confluence of the ten-year-old *CoEvolution Quarterly* and the one-year-old *Whole Earth Software Review*, it seemed appropriate to combine the routine skepticism of *CQ* with the computer obsession of the *Software Review* and let those perspectives fight it out for a while.

It's our perverse way of expressing gratitude. Computers saved our business. *CoEvolution* was nobly on its way to oblivion when we lucked into the $1.3 million contract with Doubleday for the *Whole Earth Software Catalog* (just out; for an update of its contents see pp. 74-97). Computers gave us the clarity and helped with the discipline to turn our internal finances around. Computers rejuvenated our minds; we haven't learned so intensely since college. Computers reconnected us to the future. The *Whole Earth Software Catalog* gave us back a mass audience. And a responsibility.

In criticizing some of the effects of computers are we — all of us — biting the hand that feeds us? Oh yes. But the hand, also, is food. ■

THE AMBIVALENT MISERIES OF PERSONAL COMPUTING

Haste, Seduction, and Trivialization await computer users

by Art Kleiner *illustrated by James Donnelly*

THE most compelling argument *against* owning a personal computer is watching a friend who just bought one fall inevitably to the microcomputer version of *The Invasion of the Body-Snatchers*. By Tuesday, Monday's new computer owners are hunched over their machines with contorted faces and miserable expressions. But if you ask how they feel they snarl, "It's wonderful! I love it!" and turn immediately back to pounding the keys, shouting at the programs' slowness, cursing the manuals, and reassuring themselves that only a few silicon mysteries remain before they get it running the way they want.

That's the stereotype, anyway, and it's true enough to life that the miserable novice computer owner is entering American folklore as a character type — an update of James Thurber's henpecked husband of the thirties and forties who couldn't figure out how to fix a drain. But while I'm a quintessentially irritated computer novice myself (as anyone in the office can attest after hearing me rage at stalled programs or busted printers), I think frustration is just the first hurdle. Computers produce more subtle and ambivalently disturbing effects.

During five years of using computers and two years of owning one, my mental habits have transmogrified. I notice three main effects. I work faster, but my time feels out of control. I play with new types of creative machines, but I have no clear sense of how to judge them. I work more effectively, but the leftover time is overwhelmed with mountains of inconsequential trivia about computers and the computer industry.

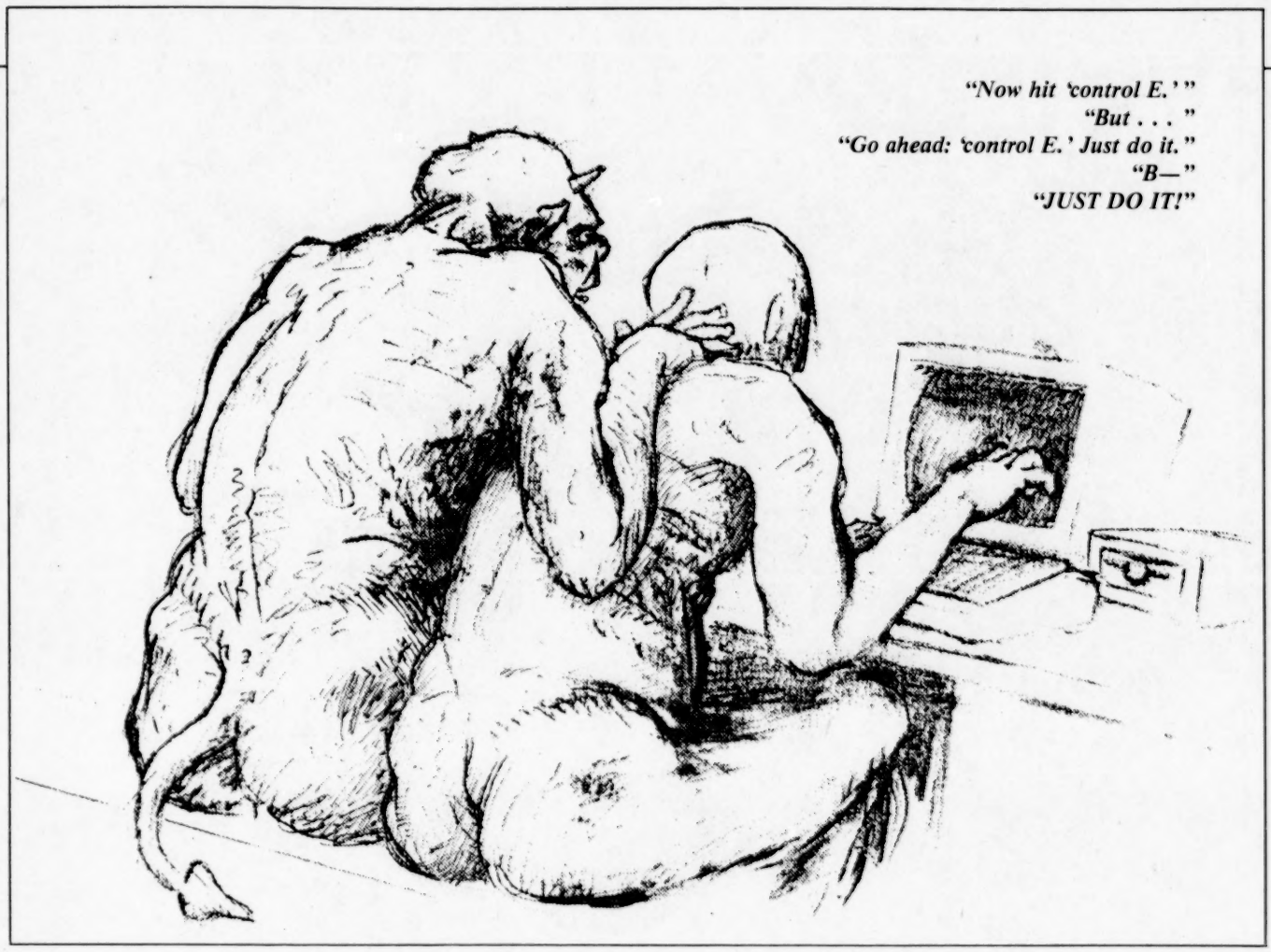
THE first effect: Computers encourage impatience because they work at a different pace than I do. They alternately race and pause. When they pause, we're their servants, waiting on the whim of the machine. Even the most highly-regarded computers make you wait: the Macintosh stalls while it fills in its desktop imagery; when you turn on the IBM PC, it keeps you staring at a blank screen until it's checked through its memory. The pauses, even if they last only seconds, make everything else in my mind stop. I feel like I'm at a mental starting gate, poised to reenter a relay race, waiting impatiently with a blank mind for the signal so I can pick up where I left off.

Once it's started my computer's pace is faster than my pace. Five years ago I could hardly read computer network text as it flowed across the terminal at 30 characters per second (300 baud, a standard telecommunications speed). The next faster standard speed, 1200 baud (about 120 characters per second), made paragraphs flash up whole upon the screen — much too fast to read. But now I read incoming text at almost 1200 baud with complete comprehension. I suspect most experienced networkers read as quickly — if you don't you fall behind in the flood of text coming your way. Now when I read a book, I must consciously slow down my reading so my thoughts can catch up. Otherwise, I unconsciously want to skip anything that isn't instantly graspable.

As I bounce between pausing and rushing, my sense of time changes. Already contemplation takes more concentration than it used to. My

Art Kleiner's enthusiasm and easy agility on computers, without quite casting him as an actual hacker, have convinced me — as magazines and computers themselves couldn't — that these machines can be mastered. But when they snag or crash, Art's utter disgust and wrath at being suckered is ferocious. We all back away, in fear of that disillusionment.

—Kevin Kelly



mind wants either to be stimulated or to be numb. I can still think with deliberation, but when I've been computing steadily, I don't feel any reason to.

THE second effect: Computer software by nature is hard to judge effectively. The stuff is seductively interactive; it reacts with a responsiveness, reliability, and malleability that you don't encounter in the tools it replaces: calculators, notebooks, typewriters, newspapers, magazines, post offices, filecards, and telephones. Whether the software is better or not (and it often is), it always *feels* better. Even if you use your spreadsheet program to add two plus two, compared to pen and paper it feels like something completely new and wonderful.

We know when creative work is good by how much it inspires us to follow through. I know that Robert Pirsig's *Zen and the Art of Motorcycle Maintenance*[1] affected my life because I found myself talking about it, corresponding about it, and tracking down some of the other books mentioned in it. A mediocre computer program can evoke the same follow-through feelings just by working. That happened in a graphic adventure game called THE COVETED MIRROR[2] which I solved this summer.

Adventure games are elaborate story-like puzzles in which characters react to your typed-in simulated actions. Tracking clues in THE COVETED MIRROR's mocked-up medieval town, I figured out how to free a thief; he helped me steal a candlestick, which I eventually traded for a shovel, with which I dug up bones, which a witch took in exchange for an invisibility spell, which I needed to snoop around the castle . . .

It took only modest animation to immerse me in the game. The King sat still but jerked his moustache each time he condemned me to the dungeon; the court jester turned a cartwheel onscreen before giving me a vital clue. The game's little jokes ("Take apple? But there's no electricity — you could never plug it in") would have made me throw a novel across the room. On the computer they inspired delight. By the time I ascended the final Peak of Shards I knew that, to live up to my feelings about it, the game's solution should reveal the hidden infrastructure of its mysteries — such as the identity of the Master Magician who'd manipulated events behind the scenes throughout the story.

I was wrong. I found the coveted mirror; the game told me I was a hero, the King said he would return someday, and it was over. There was no revelation. I felt like I'd died and gone to heaven, but failed to learn what the purpose of life was. True, I was merely gypped by my unfounded expectations — how could I judge a computer game by the standards of a novel? But even the cheapest novels tie their plots together; this game could get away with a shoddy plot because it was interactive. →

" . . . I foresaw that in the blinding sunshine of that land, I would become acquainted with a flabby, pretending devil of a rapacious and pitiless folly."
—Conrad, **Heart of Darkness**

Hacker's Progress: Euphoria. Bemusement. Confusion. Bitterness. The Grave.

The stakes are low in a computer game — all I lost was 45 hours. But imagine the expert systems that will appear on microcomputers soon. A medical student will choose between a book on diagnosis and a diagnosis program that simulates a particular doctor's expertise. The program will be more involving and easier to learn from — just as a spelling checker program teaches spelling better than a dictionary does, because it shows you *your* mistakes and how to correct them. But what if the program is wrong and the book is right? It's easy to scan books and check them against other sources. A computer program leads you down an interactive garden path — will we have the critical faculties to know when to halt? No doubt we'll develop those faculties, which means we'll come to judge other media by the standards of computer programs, just as many people judge films by the different (not *necessarily* lower) standards of TV.

THE third effect: Computer software is arbitrary and inscrutable by nature because it so completely represents the inner intricacies of a programmer's mind. The resulting need for explanation has fueled a dozen publishing companies whose work comprises the most artless, dull mass of verbiage ever bound between covers. Often you have to scan several books to find a single clue, and wading through this minutiae doesn't help you keep a larger perspective. If Dante had used a personal computer, he might never have gotten past the third circle; he'd have been too busy figuring out why his printer couldn't handle italic letters.

Fortunately, the dominating obsessiveness you need to learn commands lasts only until the commands become second nature (which happens quickly — you can't really use a computer program until its style has been melded into your synapses). However, by that time most computer owners have become instant experts about the computer industry — partly because constant learning starts to feel glamorous, and partly because there's no other way to predict which companies will survive and thus be worth buying from.

The computer world has its own magazines and celebrities. Reading current-events computer weeklies like *PC Week* or *InfoWorld* is like reading about medieval political intrigues, with machines instead of rotating courtiers. The Mindset computer, the Apple IIc, the new model from AT&T or IBM — they're everyone's favorite this week, flops headed for disaster next week, out of favor next month, and either forgotten or resurrected next quarter. The constant giddy flow of press-agentry and hype

A couple of months after I began computer networking in 1979, a Significant Person in my life, someone who knew nothing about computers, typed this plaintive artifact into my terminal. She was worried about me. We broke up a few weeks later. —*Art Kleiner*

Hello. I am typing you this message from a friend's terminal. Here is my message: I hate computers. I hate all of you. Not only are you a cloistered, self-serving crew, but you don't or soon won't care about what is going on in the world except what you can relay back and forth. Now, don't tell me this isn't true; I have already seen the effects on a close friend. Dear Ann Landers, my friend X used to be a normal chap. Then one day somebody gave him a computer terminal and he has turned into a weirdo. The slightest imbecilic messages (like this one) have suddenly taken on great meaning. I mean, he thinks this is literature, this computer rambling and body offering. To me, it's worse than disco. So, Ann, what do you think? Do you think there's a job for an Ann Landers to work in computers? And why am I so hostile? Well, let's see . . .

1. **Computers are ugly.**
2. **Computers are not soft and rarely sing.**
3. **Computers have no social graces and eat with the wrong size fork.**
4. **They never, never wake you up smiling.**
5. **I don't know how they work, but they seem to know how I do.**
6. **They are another substitute for real communication / experience. They are along the same line as movies / TV: media. I mean we are far enough from experience as it is. Why bring in another substitution for going out?**

—Name Withheld by Request

makes it even harder to tell the occasional real innovation from the flood of "preannounced" unfinished products.

That's why many computer journalists I know feel trapped by their beat. Maybe they got into it because they felt this technology would dramatically affect people, but once they enter the forest they knock themselves out against the trees. The frenzied, manipulative presidential campaign pack journalists of Timothy Crouse's book *The Boys on the Bus*[3] are contemplative philosophers by comparison. (That's less true in the last year, as some writers have matured.)

Of course, some computer writers thrive on the melee. I heard one exclaim after a computer show that he hadn't seen anything so exciting since a Led Zeppelin tour he covered in the mid-70s. But most writers know that they're too rushed to get a real sense of how and why these new machines are important; is it any wonder that the rest of us drown in contradictory and ultimately banal data when we try to figure out our own choices and perspectives?

DESPITE the flood of hype, personal computers aren't news anymore. Yes, they made enormous changes in people's lives, and created both a scene and a community; but though the attitudes and opportunities of computing will ripple out through the country, there's really no reason to hear about them again and again.

Instead, it's time to proclaim that the personal computer scene is dead. The Diggers of San Francisco proclaimed the hippie was dead in 1967 after some East Coast magazines began paying attention to the Haight-Ashbury. The influence of what has since been called "the counter-culture" carried far beyond 1967, but the basic news stayed the same. Similarly, the basic news of personal computers won't change, whether you have a 1975 Altair, a 1982 IBM PC, a 1984 Macintosh, or the Next Best Thing of 1988. The news *is* newsworthy: that owning a computer really automates personal clerical work in innumerable empowering ways, that such personal automation produces a new type of creative tool, and that personal computers offer a definite (but smaller than generally acknowledged) step toward simulating reality. (It's also unclear how good for people such ultimate simulations of reality will be.) The liberating aspect of personal computers, like that of the counterculture, will touch many people, but it won't be the only liberation of the next decade. Must we get so excited about its details that it overshadows the other liberating possibilities that will come along?

My computer misery is ambivalent. I am similarly afraid of the effect of automobile driving on my psyche, but I won't sell my car. I guess I've learned that I can't feel happy or fulfilled if I'm obsessed by computers — and yet my computer has added much legitimate opportunity and even some joy to my life. I'm taking on a personal challenge of using computers without being obsessed by them. I'm determined to find a way. Just give me a few years. ■

The stakes are low in a computer game — all I lost was 45 hours.

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2. Berns, Eagle and Thomason, Holly. *The Coveted Mirror* game program. Geneva, Illinois: Penguin Software, 1983. $34.95. Apple II family.
3. Crouse, Timothy. *The Boys on the Bus: Riding with the Campaign Press Corps.* New York: Ballantine, 1976. $2.95.

SIX GRAVE DOUBTS

ABOUT COMPUTERS

by Jerry Mander illustrated by R. Crumb

COMPUTER-NERD HEAVEN

R. CRUMB

Do they: produce toxins? Filter out feeling? Shrink the middle class? Make large-scale war possible? Overamp the nervous system? Overempower corporations?

THE FIRST SEVERAL WAVES OF NEWS CONCERNING A TECHNOlogical invention are invariably positive, even Utopian. This is so because the information comes mostly from the people who stand to gain from society taking the favorable view. In the United States, these are corporate people and their colleagues in science. Neither has a stake in reporting any down side to the story. As a result, most people gain their early insights and understandings from an agenda provided by biased sources. Passive to the introduction of new technologies — whether cars, nuclear energy, television or, now, computers — by the time we begin to notice problems, the technologies have advanced to a point where it is difficult to do anything about them. Obviously, our protection lies in developing our own agenda of questions and answers *early* in the process.

My own first exposure to computer society came in 1941, when I was five years old. My parents took me to the New York World's Fair. The most impressive exhibits were corporate visions of an automated future. I remember gigantic dioramas of several-tiered technocities, clean, sparkling, everyone flying around with little rocket packs on their backs. It was a vision of a world where human labor had been eliminated by automation; at last we would be free of unremitting toil. I think it was the DuPont exhibit which contained "the typical home of the future." Everything synthetic. A staff of robots called by pushing buttons. Nonstop entertainments everywhere, including that computer-TV-looking thing. From this you could also order your groceries, get your newspaper, and speak to friends anywhere in the world. The people in the dioramas just sat there, smiling.

The Fair was a hit during hard times, when we were in an awful war and consumer technology was minimal. We longed for that DuPont dream. How could there be anything wrong with it? Wouldn't everyone want a work-free society? Couldn't technology deliver that? Didn't everyone like automated households where you never needed to go outdoors? And what about those neat little robots? It was a kick to imagine it all.

Those visions, of course, were advertising. We have seen a steady stream of it ever since. Last year, the microcomputer industry alone spent more than $700 million in advertising, more than half of it on television, placing the industry among the largest advertisers in the world. You have only to switch on your TV tonight to observe the themes: computers set you free, they aid democracy, they bring you the power to live your life on your own terms. Neither you, your business, nor your child can survive in the future without them. The archetypal commercial is that Apple Macintosh spot showing an Orwellian environment in which a female runner, carrying a huge hammer, smashes the hated image of Big Brother. Apple is saying that computers deliver freedom. They are anti-oppression. It's amazing to me how many people accept that idea when it is at least arguable that the opposite result obtains.

The $700 million ad expenditure doesn't include compatible ads from other industries praising computers. Auto commercials speak of computerized features. Military recruitment ads, bank ads, airline ads all celebrate their involvement with the latest in computers. All this advertising, added to the praise heaped

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Two things influenced me (and, I bet, many other people) to stop watching television. One was Jerry Mander's 1978 book Four Arguments for the Elimination of Television *($5.95 postpaid from William Morrow and Company, 6 Henderson Drive, West Caldwell, NJ 07006). The other was the personal computer, which ate up all my television time. In this article, Jerry Mander begins to apply the same perspectives to computers — both institutional and personal — that he applied to television seven years ago. The "grave doubts" unearthed here will articulate most of the concerns that non-computer users have about the effects of these pseudointelligent machines on people and society. Jerry says he will refine and expand this material, along with criticisms of other technologies, in a forthcoming Sierra Club book concerning technological society and indigenous peoples. Jerry's background is advertising; he's written many environmental-activist ads ("Should we flood the Sistine Chapel?") during the last two decades, and is now a senior fellow at the Public Media Center in San Francisco, a nonprofit advertising agency working only for other nonprofits.*

Illustrator Robert Crumb is well-known both as cartoonist and curmudgeon. He got the assignment partly to resonate with the great illustrations he did for the Four Arguments *excerpts we printed in 1976. Even with a new name, this magazine doesn't forget.*

We mocked Jerry when he revised a draft of this article in our offices, laboriously retyping it instead of entering it on a word processor. But he had the last laugh. The next day we lost a morning's worth of typesetting on this article — the computer went down before we could save the file. —*Art Kleiner*

upon computers by scientists, industrial leaders, even politicians, combines to create an overwhelming climate of optimistic expectation which is now ubiquitous. Most people, not technically trained, not living in a society which views technology skeptically, and not practiced in criticism, tend to accept the corporate agenda or to view the machines from the isolated perspective of their own interactions with them. For example, while working on this article, I must have been asked ten times by friends how I could argue that computers might be a problem when they are so useful to writers. Indeed they may be. And you can play some fun video games with them, too. But is that the point?

What we need is to develop a way of discussing computers, and all technologies, from what we might call a "holistic" perspective. The question must not be confined to whether a computer serves your organization well, or whether it spits out perfectly-edited copy. We need to view the computer for the totality of its effects upon society and life on Earth, and to ask questions which will bring forth that picture. How do computers affect concentrations of wealth and power? Who gains and who loses because of their existence? Do computers have environmental effects? What are they? What about diversity of culture and thought? The way we work, and who gets to work? What are the effects on what we know and are capable of knowing? What is gained and what is lost?

What follows are some of my own first observations. Six perspectives you won't find in the ads. They are not meant as a complete case, by any means, but as a stimulus to others.

1 ARE COMPUTERS "CLEAN"?

The microelectronics industry enjoys an image of extreme cleanliness, somehow above the usual pollutions, workplace dangers, and ugliness of the old "smokestack" industries. These days it's virtually impossible to run for public office unless you visit Silicon Valley and proclaim the industry as the crest of the new age of superior technology. I thought one presidential candidate, Gary Hart, even looked a little like a computer: clean lines, well groomed, futuristic.

A colleague of mine at Public Media Center, Jonathan Polansky, recently put it this way: "It's as if computers are immaculately conceived, created whole, like a miracle, without waste or grime." And Ellen Weiss of the Museum of Modern Mythology said she felt it was the *silence* of the computers that sustained the image. "Everything seems to happen by magic. No noise. No moving parts." As usual, however, there's no free lunch. Computers seem to produce doubtful effects upon (1) the people who use them, (2) the workers who build them, and (3) the communities the plants call home.

The effects upon users include such relatively minor problems as fatigue, eye strain, migraines, and backaches, as well as more serious problems like cataracts and, among women who work with VDTs, reports of miscarriages and birth defects.

Meanwhile, very little has been reported about the effects upon people at the production end of the cycle. Lately, workers in Silicon Valley have been protesting that they too are experiencing high rates of miscarriages and other reproductive system problems, as well as loss of hair, chronic asthma, and other disorders apparently resulting from handling the toxic chemicals and gases involved in computer chip manufacture. According to attorney Ted Smith of the Silicon Valley Toxics Coalition, "Workers and the general population are being exposed to the most deadly chemicals that have ever been synthesized." And Dr. Joseph La Don, Chief of the Division of Occupational and Environmental Medicine at University of California, San Francisco, has said that, "The computer industry has a high incidence of occupational illness, more than three times the average manufacturing industry." The computer industry has responded to these complaints by moving much of its manufacturing abroad to Korea and Southeast Asia, where workers are less well-informed as to why their hair falls out, and don't ask for much pay, either.

The computer industry has a high incidence of occupational illness, more than three times the average manufacturing industry

Computer manufacturing also produces environmental side effects. More than 2 million gallons of acids and 500,000 gallons of solvents were used in Silicon Valley production last year, and it has found its way to some leaky toxic dump sites. High concentrations of trichloroethylene recently showed up in the drinking water of several communities in Silicon Valley. Some computer companies, while not admitting guilt, passed out truckloads of free bottled water in the affected areas. The Environmental Protection Agency has identified eighty such chemical spill sites around the country, some of which will be added to the government's Superfund clean-up program.

2 COMPUTERS AND INFORMATION FLOW: WHAT IS GAINED AND WHAT IS LOST?

In the telecommunicating age, "information" is increasingly defined in terms of what can be collected and processed through machines. That computers, like television, are opaque to many kinds of information — sensory information, moods, feelings, meaning, context, among many others — is given little note or importance. And yet there are important consequences. Subtracting sensory information makes it difficult to communicate the nuances of nature and nature-based culture or to communicate human essence. Subtracting feeling leaves information, understanding, and decision-making in the dry realm of the objective.

That we don't take such consequences seriously means we accept an information hierarchy with objective data on top and subjective information on the bottom. If there's a loss there, for example, of Indian culture and values, so be it. A few years ago I mentioned this in a printed debate with telecommunications guru Gene Youngblood. His response was, "Oh, no, not that old Sixties chestnut, the Indians."

* * *

At a recent conference of Circumpolar Peoples (native people who live in the northernmost parts of the planet), it was announced that the Canadian government was giving computers and computer training to the Inuit in northern Canada, purportedly as a useful tool with which to resist oil company incursion. The computers would help the Inuit keep track of wildlife patterns so that with the printouts on hand, they'd more effectively argue their case against the businessmen. The computers would also help Inuit communities find work for their people at development sites and manage community affairs.

The theory was that computers would put the Inuit on the same information plane as the corporations, who tend to view nature from an objective perspective. Perhaps, but it's worth mentioning that this mode of reckoning the environment will sacrifice many dimensions of information formerly used by Native people. Now the language will be in terms of "cost benefit," "sustainable yield," and "animal units." The more powerful mythical, sensory, historic, and spiritual relationships with creatures and the land, the dimensions which sustained the Inuit for thousands of years and make them different from you and me, will be amputated. In the end, I believe, the Inuit will begin to conceptualize the animals in the same way as the corporations, and Canada will have achieved something more than it originally suggested.

* * *

In California, if you wish to spend a night camping in a state park, it's necessary to make a reservation at a Ticketron office at least ten days beforehand, where the computer assigns you an available site. What a conceptual change just *that* act involves; nature was once something you lived within and now it is walled off and entry can be had only through a machine.

I thought of this while reading the July 1984 *New Age Journal,* which contains a story on "The Computerized Forest," by R.H. Ring. He laments the conceptual change among U.S. Forest Service workers who now do their job mainly via computers. The entire Forest system, says Ring, is now divided into "management units" containing "habitat capacity" models which reduce the needs of species to mathematical formulae. "Minimum viable populations" is one such formula. The Flathead National Forest in Montana has a planned "output" of 200 grizzly bears. Old growth forest is called "accumulated capital." Hiking in Colorado's aspens at White River National Forest is assigned a value: nine dollars per day.

It ought to go without saying that certain elements of forests resist objectification: the unnameable feelings and moods, the subtle relationships. Forest managers once attempted to include those dimensions, but as the management concepts change, Ring reports that the Forest Service workers are also changing.

The new breed does not come to the task with a basic loyalty to and personal involvement with the land, the animals, and trees. They are concerned with abstractions like production goals and budgets. When mood, nuance, and feeling are subtracted from the information model, you have lost the elements by which nature is able to communicate. The result is only attractive to people who enjoy dry, passionless data.

These events at the U.S. Forest Service are compatible with an already well-advanced change in concepts of nature throughout the country. In my lifetime I have seen vast stretches of the United States lost to paving, freeways, and suburbs. There is actually less nature now than there used to be, and it is further from view and further from inclusion in people's thoughts and feelings. Now the computer has succeeded in creating a conceptual separation even among people who live directly within the forests. Those who can't accept that change drop out and are replaced with the sort of people who match the machines. In that sense, computers are an instrument of cloning.

* * *

What do you think about the takeover of computers in the school your kid goes to? Computers are replacing many teaching functions, and many teachers as well. In California there are some 60,000 computers in classrooms. "Computer literacy" is required in many colleges and high schools. What is gained and what is lost by this process?

There's been considerable praise for the computer's interactive quality. It gives the assignment, the kid reacts, and when all goes well the computer responds with praise and user-friendly encouragements. The kid feels rewarded. Advocates point out that teachers are often too busy to be that "personal." And there's apparently a considerable satisfaction from affecting change on the computer screen, like seeing yourself on television. Certain drilling procedures in math, science, or English are well suited to computer education models. The machine can advance students to new levels at the appropriate moments, or keep the education process going even where there is no human teacher on the same floor of the building. Effective software programs teach reading and other skills to kids who might otherwise have difficulty.

It's not necessary to deny that machines can teach in order to ask what sort of kid results from this process, and what sort of knowledge is emphasized. Marian Kester, writing in the Toronto Globe and Mail, asked this: "If children are separated from their parents by hours of TV, from their playmates by video games, and from their teachers by teaching machines, where are they supposed to learn to be human?"

* * *

Do kids get smarter from computers?

Seymour Papert of MIT has said that learning computer programming leads to "conceptually clear thinking," and that children who do so can better deal with complex problems elsewhere. But Joseph Menosky, writing in *Science* magazine, disagrees. He reports that Roy Pea of the Bank Street College of Education tested

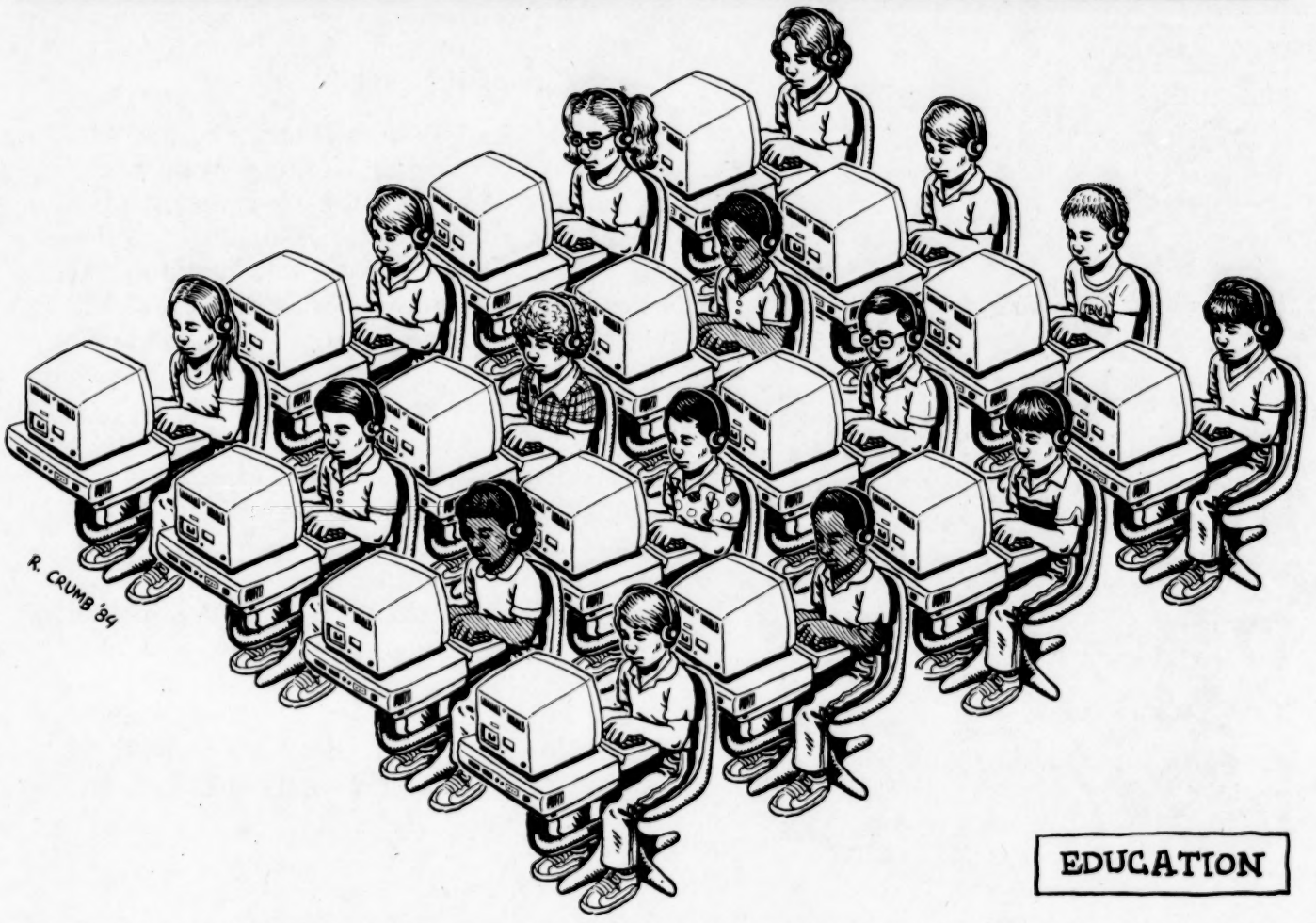
If children are separated from their parents by TV, from playmates by video games, and from teachers by teaching machines, where are they supposed to learn to be human?

kids who had learned LOGO, the computer language from MIT, to see if those kids organized their work better or more clearly.

"According to Pea," said Menosky, "the children displayed 'production without comprehension.' In other words, . . . children can seem to understand while only going through the motions. This is exactly consistent with studies of college computer science majors with thousands of hours of programming who yet fail to understand the principles that underlie even brief programs. These studies raise serious doubts about the sweeping claims made for the cognitive benefits of learning to program."

* * *

I fear that as computers are increasingly used in education, three results will obtain. First, as with the Inuit and foresters, a certain sort of knowledge will tend to dominate, while other more subtle forms recede. Like the wilderness, which has disappeared from the landscape and from our minds, many concepts will go down the tubes. Secondly, as computers replace teachers — which will certainly happen more and more — the certainty of computer programs will replace the subtlety of human student-teacher interaction. I am not saying that all teachers are better, necessarily, for all subjects at all times than computers. It's just



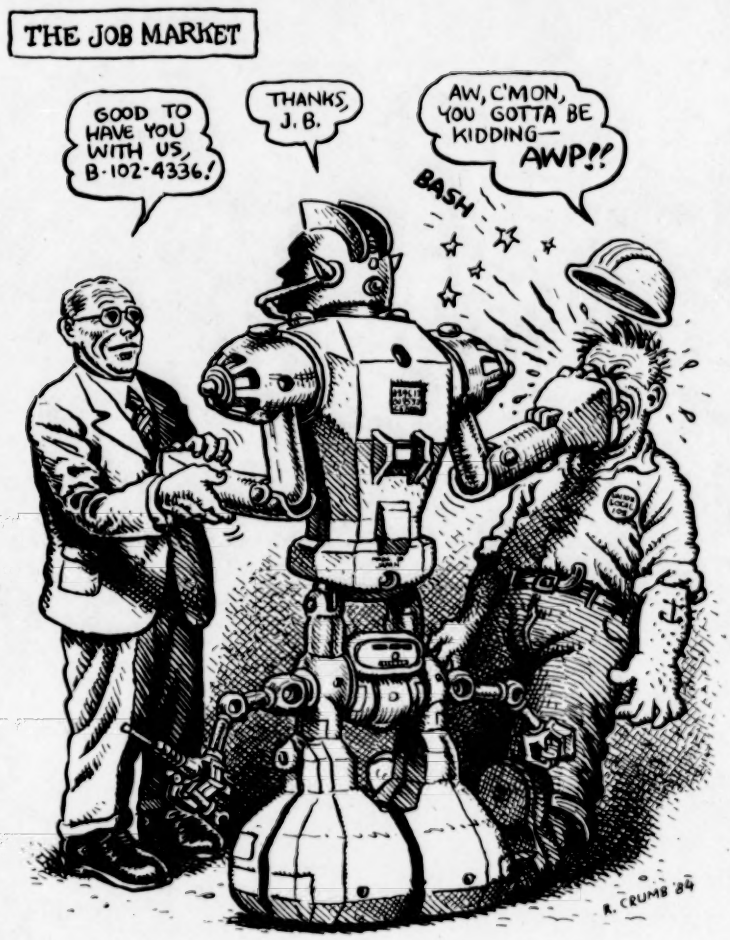
that something else goes on among the humans that ain't in the machine. Third, as computer programs replace teachers, a great degree of uniformity will likely emerge. Even now, corporations provide a tremendous amount of "educational materials" to schools. When they can also provide the computer programs that every kid interacts with, especially in the absence of human beings to mitigate the process, we will be much closer to an official, unified field of knowledge, narrower than at present (though perhaps deeper in a few areas like science) and consistent with corporate values.

3 DO COMPUTERS FREE US FROM TOIL?

At the 1940 World's Fair, American Industry said that computers and automation would eliminate toil, freeing us to pursue higher goals. In the 1980s they say that the computer industry will open new careers and new kinds of industry. In reality, both claims are just advertising pitches attuned to concerns of the moment. What automation and computation actually do achieve is the elimination of a lot of jobs, liberating human beings to stand in unemployment lines.

That optimistic vision of a work-free society, with machines doing the producing, could only be realized if the economic benefits of automation and computation were somehow shared among the populace. We would need a revolution for that. In capitalist society, the benefits obtain to the people who *own* the machines. Now they can get the job done without pesky human beings demanding increased wages, safety on the job, health plans, and profit sharing. As my friend Jack Edelson, who runs a small manufacturing business in San Francisco, said, "The worst thing about computers is that they're going to eliminate the middle class. Blue collar workers are losing their jobs to robots; they can't buy houses anymore, and we're soon going to be a country with more rich people and a lot more poor people. Big industry says automation is going to produce more jobs, but that's baloney. There are new jobs around, but they're at McDonald's at minimum wage."

What Edelson learned on the job many academics support. Drs. Henry Levin and Russell W. Rumberger of Stanford University's Institute for Research on Educational Finance and Government wrote this: "The evidence suggests that high tech is not the place where most new jobs will be found, nor will high tech require a vast upgrading of the skills of the American labor force. To the contrary . . . the proliferation of high technology industries is far more likely to reduce the skill re-



quirements for jobs in the U.S. economy than to upgrade them (thereby lowering wages).

"Last year the Labor Department projected that jobs for computer programmers would grow between 74 percent and 148 percent (during the '80s) while overall job growth would only be 22 percent. But the percentages are misleading. The total number of new jobs for computer programmers is expected to be 150,000. Some 1.3 million new jobs are projected for janitors, nurse's aides, and orderlies. That's nine unskilled jobs in these categories alone for every computer programmer. In fact, no high tech job even makes the Labor Department's top 20 in terms of total numbers of jobs.

"New jobs for data processing machine mechanics will increase 148 percent, the fastest growing job category. But that large gain translates into an increase of fewer than 100,000 new jobs, while 800,000 new jobs are projected for fast-food workers and kitchen helpers alone.

"Neither will the high tech transformation of existing jobs create demands for increasingly sophisticated work skills . . . Studies suggest that the new technologies provide opportunities to further simplify and routinize work tasks and to reduce the opportunities for worker individuality and judgment. In such diverse areas as office work, data processing, drafting, wholesale and retail trade and computer programming, microcomputers are making it possible to utilize persons with lower skills to perform (what have been) highly sophisticated functions . . ."

Diana Roose, Research Director of the National Association of Working Women (9 to 5), told me that the TV commercials depicting joyful secretaries, or the ones showing the computer as somehow liberating, were extremely misleading. "Since the introduction of the computer into office work, job design has changed in negative ways," she said. "The typing and retyping part gets easier, but workers hate many aspects of these machines. . . . Secretaries now have to deal with production quotas, since performance on the job is evaluated much more in strictly objective terms. It used to be that a clerical worker would also be evaluated for her or his personal, human contribution of energy and ideas. Now there is hardly any variety in office work. The jobs are dead-ended, and because the human connection is eliminated, jobs are also less secure. Some people are calling office work the electronic assembly line."

4 COMPUTERS AND THE SCALE OF WARFARE

It was possible to annihilate the world before the invention of computers but it was far more difficult than at present, and much less likely. The computer has made possible a degree of military centralization that never before existed. Generals sitting underground somewhere outside Washington, D.C. can, at one moment, observe the position and state of readiness of virtually all U.S. military hardware around the globe, as well as a high percentage of Russia's. Russian generals can do likewise.

From military central it is also possible to fire all this stuff and track its progress via computerized displays not unlike those shown in films like *War Games*. In fact, the experience for the war managers is now similar to playing a giant video game — following electronic blips on a massive screen — abstract, cerebral, removed from direct involvement at least until the things finally start exploding. One could make the case that this manner of warring itself makes war more likely since it separates humans from the consequences of their acts, unlike the days when you put a bayonet through a person's body and watched him bleed. And when enemy missiles are only blips

on a screen, impossible to verify by actual observation, there is always a chance of error. More than once our computer early warning systems have mistaken flights of birds for missiles.

But the greatest danger is in the way computers minimize the time available for human decision making at critical moments. Even after the invention of atomic bombs, worldwide destruction was a difficult job mainly because of the time it took to achieve. You had to load up bombers and fly them great distances at relatively unimpressive speeds. This allowed several hours for human intervention from both sides. Even if one bomb was dropped, there might still be time to call things off before *all* the bombs dropped.

Computers and rocketry have changed that. They have combined to drastically shorten the time between the *decision* to push the button and the achievement of the final result. Warheads no longer fly in creaky bombers, but on computer-guided missiles, targeted and shot into space from computer central at astounding speed. And there's now the incentive to fire *all* missiles at once, since an enemy can so quickly react. Once a war begins, total destruction is now the likely outcome.

Right now, U.S. and Russian missiles are six minutes from each other's borders. If the headquarters computer suggests an enemy attack, six minutes are available to verify the accuracy of the data (difficult), locate and inform the President, and then, in the time remaining, for the President to make a decision. In such circumstances, can you call that a "decision"? It would have to be pre-planned. There'd be no time for careful consideration of creative options. In such a modern computer war, human involvement, while still nominally part of the process, at the most critical moments becomes so limited as to be effectively meaningless.

It's in recognition of the difficulty of human decision-making in modern warfare that we lately hear talk of "launch on warning" (immediate launch of missiles at the first computer warning) as a viable policy. The Soviets have actually threatened this in the European theatre in response to our Cruise and Pershing missiles, though U.S. officials call it a bluff. Whether the Russians do institute "launch on warning" or they don't, the point is they *could*. So could we. The technical capacity is there for people to be dropped completely out of the decision loop, leaving us with a kind of automatic war: our computer program vs. theirs. Software war.

Can we blame computers for the above scenarios? Most people, even if they have perceived a relationship between computers and the imminence of war, hold the computers themselves harmless. "People invent the machines," is the common wisdom, and "people push the buttons." And yet it is a simple fact that if there were no computers, the process of engaging in war would be a much more drawn-out proposition, with a lot more time for human beings to change their minds or seek alternatives. In fact, it is only because of computers that this virtually instant war — especially at the worldwide level, producing total annihilation — even enters the realm of possibility.

When evaluating a technology, and seeking to articulate the way it changes the circumstances of existence, we must always consider the worst possible use of that technology. Only then is our judgment informed. In America we tend to speak only of the positive potentials, because that's the way inventions have been introduced and sold to us. And yet the worst possible use of computers — as instruments of holocaust — has already been planned and is at least as likely to be the final outcome of the computer age as is the achievement of some kind of pure democracy.

5 IF SMALL IS BEAUTIFUL, WHAT ABOUT SLOW? THE COMPUTER ROLE IN THE RATE OF ACCELERATION.

In recent years, there has been a turnaround in the idea that bigger is better. We now have political movements based on an "appropriate scale" for technology which allows for living in balance with nature. Still most of us have not noticed that *speed* is a dimension of scale.

Today's largest institutions — the military, the corporate, the bureaucratic — can be only as large as permitted by their ability to communicate among their diverse parts quickly, with mind-boggling amounts of data. Telecommunications have put the equation in those terms, shattering the limits of physical size that once existed. Now an entity can spread itself outward to encompass the entire planet. National boundaries are anomalies.

As the computer has sped up the information cycle for institutional activity, so has it done for human beings. As society increasingly emphasizes computers, we are receiving an ever-increasing amount of data, most of it unuseable in any practical sense. As life around us accelerates, we also accelerate, but it's not our

minds which experience the acceleration. It is our nervous systems.

* * *

I have often heard video games praised because "they speed up hand-eye coordination." In response I ask why it's a good thing to speed up hand-eye coordination when the only real value, save perhaps for a professional basketball player, is to get up to speed for the next computer function. Ronald Reagan has not missed the point. He recently publicly praised video games as good training for a new generation of bomber pilots whose task is similar to video game problems.

For 400,000 generations, human hand-eye coordination was attuned to an environment which operated at what you might call "natural speed." Everything that human beings had to deal with moved at speeds appropriate to our abilities, or vice versa. It would have had to be that way for our species to survive; humans evolve to keep up with the task at hand.

With the industrial revolution, many things began moving at mechanical speed. As the natural environment was paved over, and as human beings moved life into human-created environments, the natural rhythms with which we formerly reacted gave way to industrial rhythms. We learned to interact with mechanical speed, as any assembly-line worker knows. And most auto drivers. Now that machines move at electronic speed, the wheel of activity turns faster, with us on it.

Video games *are* good training for the faster world. When you are playing a video game, your goal is to merge with the computer program. The electronic symbols on the screen enter the brain, pass through the nervous system, and stimulate the "fight or flight" reaction which still lives in us and which here expresses itself in the hands. Very little thinking is needed or used in this process. The object is to respond without thought, instantly.

A skillful video game player stimulates the computer program to go faster, and as the circle speeds up (computer program to nervous system to hands to machine to computer program) the player becomes as one with the machine. They become connected in one fluid cycle, aspects of each other. Over time, and with practice, the abilities of the human being develop to approximate the computer program. Evolution is furthered by this sort of interaction, but it is of a notably different form than prior evolutionary processes. Where evolution was once an interaction between humans and nature, it now takes place between humans and human artifacts. We co-evolve with the environment which *we* have created — with our machines. We co-evolve, that is, with ourselves. It's a kind of in-breeding, and it makes us think nature is increasingly irrelevant to us.

Video games accelerated a process that has been directly stimulated by a generation of television viewing. Most poeple think of the two as different because TV looks "passive" while video games involve interaction. But

Computers minimize the time available for human decision-making at critical moments.

I have argued for a long time that TV, while it pacifies the brain, speeds up the nervous system. The Australian National University report on TV as a cause of hyperactivity among children explained that a kid sitting silently watching TV might see people punching or killing each other. This stimulates the "fight or flight" reaction of the nervous system, but since it's television, a physical reaction would be absurd so the body remains inert and the feelings are suppressed. When the set goes off, the saved-up energy bursts forth in wild, formless hyperactive behavior. If you have kids, you have probably seen this.

Also, when watching TV, you live in a much more rapid perceptual universe. Rapidly changing images, 15 edits per minute, incredible condensation of time, movement backward in time and forward, cartoons on and off, outdoor images and then suddenly indoors, music, whirling, rising images, a potpourri of hyperactive stimuli most of which is impossible in ordinary life. This is also the case with video games and to some extent computers in general.

An average child who watches television for five plus hours per day, then plays video games, is living within a rapid perceptual universe for much of his waking life. When that whirling-spinning-exploding world is turned off, he or she is left in real life, the room, the house, a much slower world. Boring by comparison. If he or she then goes outside into nature — well, nature is *really* slow. It barely moves at all. It takes an extreme degree of calm to perceive things happening in nature, and I suspect we may be producing a generation of people too

sped-up to attune themselves to slower natural rhythms. So, back into the house. Where's that video game? Get it back on, ahhh . . . back up to speed.

Television. Video games. Computers. Walkmans. The kids carrying those big radios down the street. And the *street*. Fast moving information there too. They are all connected as part of a speed-up process that is spinning our lives faster and faster. The final product will be a subtle one. Another degree of separation from the environment. Alienation.

* * *

As I was writing the above, my friend Marc Kasky wandered in, read a little over my shoulder, and said, "Listen, don't forget to tell them this. Computers don't only speed up people, but they interact with other technologies to speed up the rate at which other negative industrial processes take place. They're used from satellites and airplanes to locate resources in the ground and ocean. Computers, space technology, and infrared photography have combined to turn up the speed of the destruction of nature."

6 DO COMPUTERS HAVE POLITICS?

A few months ago I attended the First Bioregional Congress in Kansas City — 250 people working toward the disintegration of central political power. This group favored local control, economic self-sufficiency, and small scale, nature-based principles. "Green" communities. A number of participants advocated a role for computers in building "networks" among the bioregions, thereby facilitating rapid exchanges of information. Though this might create some centralization, it was argued that computers are a "neutral tool" which could be used with equal benefit by people whose goals are anathema to the large institutions that may have invented the machine and thus far dominated its application. This is a tempting idea. We can take their invention and with a kind of jiu jitsu, turn it against its creators. A similar view is held by the political "left" in the U.S., which argues the uses of a tool are solely determined by the ideologies of the people who control it. Technology is neutral. The machine itself cannot have any built-in ideology.

This assumption, the neutrality of technology, is a basic paradigm that most Americans accept. And yet, it is a preposterous notion, and one which furthers our continuing passivity toward the onrush of new machinery. The simplest examples to discuss are nuclear and solar energy. Are they "neutral" technologies? By reason of the cost, complexity, and danger of nuclear energy, it can only be undertaken by huge institutions. You and your neighbors could not get together and build a nuclear plant down the block. The effects of nuclear energy are longterm: 250,000 years, requiring that future societies make many decisions of a predetermined sort to deal with the leavings of what is being created now.

The alternative, solar energy, can easily be managed by a few people and operated on a very small scale. It *is* possible to design centralized solar energy facilities, but it's relatively difficult. The technology is more efficient on the smaller scale. So, in comparing the two energy systems, it's fair to describe nuclear energy, as Leopold Kohr has, as an "appropriate technology for a society interested in centralized solutions." Solar energy, meanwhile, is appropriate for a society interested in decentralized solutions. These are *political* tendencies which are built into the technologies. Such tendencies can be found in every technology, if we seek them out.

What about computers? At first, computers have the look of a decentralized instrument. You can have one in your home and get it to do things in service to your life and your projects, though, for most people, not as many

things as expected. If you are a writer, word processors relieve much of your drudge work. Computers can benefit small groups, small businesses, political activisits, and bioregionalists. Organizations can store information, network with other groups, process mail lists, prepare clean copy, keep membership lists, keep accounts, and the staff can play video games in the lunch hour. But I don't think this is the way to think about the issue. It's not who benefits, but who benefits most?

People interested in decentralized political solutions would be better off if computers were never introduced into society. For all their aid to small scale operations, computers help the largest institutions the most. They make certain large institutions possible that weren't before, and they serve the economics of scale the same way as other technologies like mechanical farming, pesticides, satellite communications. Computers may be a neutral technology, but they are quite a bit more neutral for some than others.

Larger enterprise can afford more computers than smaller operations, more sophisticated ones, operated by better-trained staff, and with more interfaces among the computers themselves. The larger the scale of the operation, the more parts and pieces that must be integrated, and the greater output per computer unit.

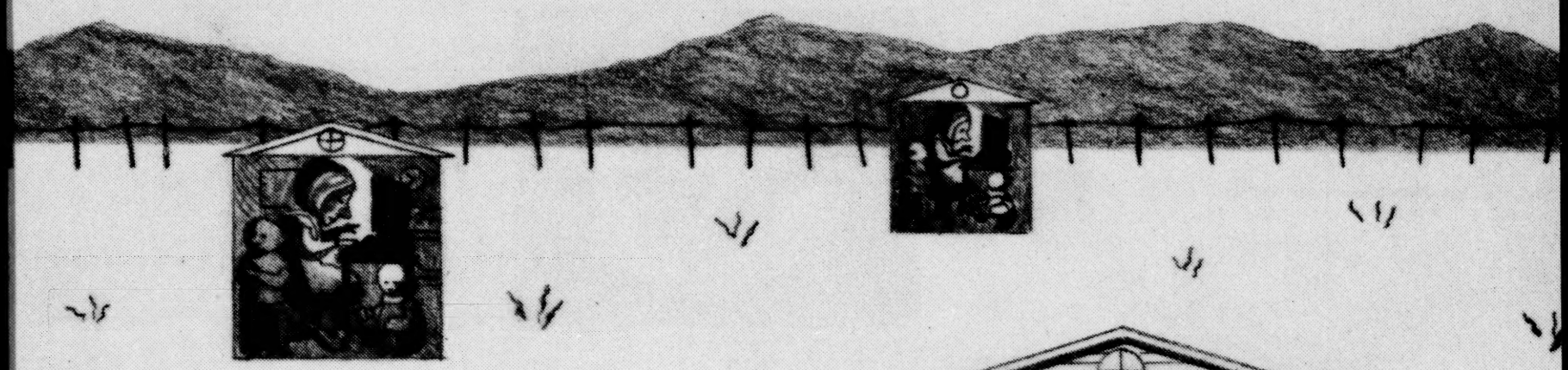
If you operate a small business, such as a medium-sized food market, a computer can help with inventory control, accounts payable, accounts receivable, payroll, taxes, sources of supply, and price. But while the small business is aided in the short run, the large supermarket chain can use computers to undertake more operations at a wider level: buying and selling, price competitions among regions, shipping coordination, inventory controls at a national or international scale, credit operations, market analysis, profit analysis, employee productivity analysis, shelf-movement analysis, as well as the usual routine payroll and accounts management tasks. It would be fair to guess that a large chain like Safeway could be aided by computers at least twice as much as the smaller operator. This reflects itself in price differentials on the shelves, consumer attitudes about efficiency, varieties and profitability of items stocked, overall profit, and more. In the end, the larger institution grows more dominant and swallows the smaller.

The Fall 1984 issue of *Hermes*, the publication of the Columbia University Graduate Business School, was largely devoted to a report of the hundreds of ways that computers are now used in large-scale business operation, especially at the multinational level. In fact, one third of the curriculum of the Business School is now being urgently revised to give a major role to information technology. The functions discussed include corporate relations, corporate finance, accounting, international financial marketing, consumer marketing, management science, and operations management. Simulation games on the computers will now prepare students for the "real world" of multinational activity. Some games will include forecasting of economic trends in various nations, labor-management negotiation strategies, statistical analyses, and game options, such as abandoning certain countries to move to other labor markets. (One wonders whether "subjective factors" such as consequences to long-time workers who are fired are ever mixed in, and how?)

For all their aid to small scale operations, computers help the largest institutions the most.

Computers not only aid today's multinational corporate enterprises, they make them possible. International financial institutions, for example, needing to keep track instantaneously with millions of pieces of information from all over the world, simply could not operate as they do today without computers. That they are now able to relate instantly to all parts of the world has popped these institutions into a new dimension outside even such huge locales as nations. In a way, today's multinational enterprises are not located anywhere except in the computer itself. Looked at from that perspective, it's clear that the computer is not in equal service to all parties. While you and your colleagues are networking about corporate behavior in a forest near you, that same corporation is moving information among thousands of its disparate pieces all over the world. The machine helps them more than it helps you. It's not neutral. And when a new, better computer is built, they will have it first.

People involved in political movements toward decentralization may find computers beneficial in their individual tasks, but it would be a very grave error to celebrate the existence of computers in the world. In my view, decentralists, ecologists, and people interested in progressive reform of any sort would be wise to address the very existence of computers as an urgent and relevant issue in itself. ■



HOUSEBOUND

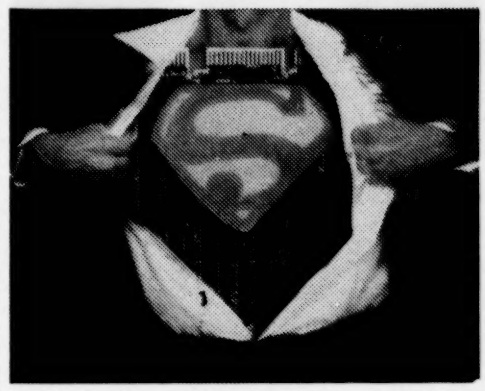
by Joan Howe *illustrated by Ellen Sasaki*

Many writers have described the benefits of *telework*, the practice of "going to work" by dialing up a remote computer system (usually from home) instead of physically going to one's employer's premises. As telework becomes widespread, we are told, the air will become cleaner due to reduced automobile use; the disparity of economic opportunity between city and country will equalize, bringing new economic vitality to small towns; and families will have more time for homemade bread and Togetherness now that nobody has to go out there and fight the traffic jams anymore. The only ill effects of teleworking that any of these writers mentioned was that some families might begin to use the network to supply all their needs so that they never saw anyone but each other for years at a time, and that this might have "unknowable" social and psychological consequences.

Actual teleworking, as it is beginning to be practiced in various parts of the country, looks a little different. Professional-level employees, offered telework as an option, usually exercise that option no more than two or three days per week, preferring to go to the office in the traditional manner the rest of the time. Those who use telework exclusively are more likely to be people whose major commitment is at home, and who use telework to bring in a little extra cash — farmers, for instance, and most notably, mothers of young children. For these people, the work available is often routine clerical work and production typing, the kind of work usually offered to women. Given large employers threatened by the possibility of unionization among clerical workers, and given the tenacious persistence of the traditional nuclear family structure, the consequences of telework begin to look like something out of *The Feminine Mystique*, or perhaps *The Pursuit of Loneliness*: large numbers of "post-feminist" women returning to the home, not to quit working, but to work even harder, since all the duties of the traditional housewife will still be there in addition to the opportunity (need) to earn a wage via computer networks.

With the phone constantly tied to the home terminal, either for work or to order the family's purchases (thus saving the precious time spent shopping in person), the teleworking wife will be even more isolated than her counterpart of the 1950s. Under pressure to avoid leaving home in case new work comes in or a package is delivered, her life will give new meaning to the term "housebound." Meanwhile, her non-teleworking husband will derive a competitive advantage over those of his colleagues who lead a different, perhaps more egalitarian way of life, since he will be free of most household or family duties. His family lifestyle (what might be called Electronic Traditional) will become the maximal-earning and thus the high-prestige lifestyle, and all other lifestyles will have consequently lower prestige. Telework is technology's gift to conservatives, and bodes decidedly ill for feminists. ■

Joan Howe is Senior Programmer/Analyst at Blue Cross of Massachusetts in Boston, where she rides the big ones — IBM mainframes. This essay emerged from her recent master's thesis on the social effects of commercial computer networks. —*Kevin Kelly*



WESPERCORP

MYTHINFORMATION

COMPUTERS PROMISE THE FOUNTAINS OF UTOPIA BUT ALL THEY DELIVER IS A FLOOD OF INFORMATION

Mythinformation (n.): The almost religious conviction that a widespread adoption of computers and communications systems, along with broad access to electronic information, will automatically produce a better world for humanity.

by Langdon Winner

During the last three years, dozens of books have extolled the political and social promise of small computers and electronic networking. The best known is probably Alvin Toffler's The Third Wave. *Their arguments, to me, all smell like fancy French cheese — appealing, loaded with status, but reeking of something subtly fetid. I haven't always known why, but I've always been unconvinced. This article by journalist/academician Langdon Winner is the first to articulate that uneasy feeling.*

Langdon teaches political theory — especially on the relationship between politics and technology — at the University of California at Santa Cruz. He wrote Autonomous Technology *(1977; $6.95 postpaid from M.I.T. Press, 28 Carleton Street, Cambridge, MA 02142), one of the few good books to question the hold technology has upon society. Like Stewart Brand, Langdon has led seminars given over the EIES computer network. He's not a novice; he said that after using computers one year, "I decided to read up on the scholarly and popular literature on computers and society. 'Mythinformation' was my first response." It will expand into a chapter in Langdon's forthcoming book from The University of Chicago Press,* The Whale and the Reactor.

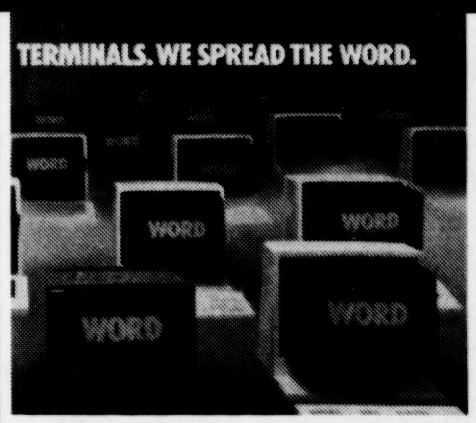
—Art Kleiner

THE specter of computer revolution is haunting modern society. Books, magazine articles, and news-media specials declare that this upheaval is underway, that nothing will escape unchanged. Like political revolutionists, advocates of computerization believe that a glorious transformation is sweeping the world and that they are its vanguard.

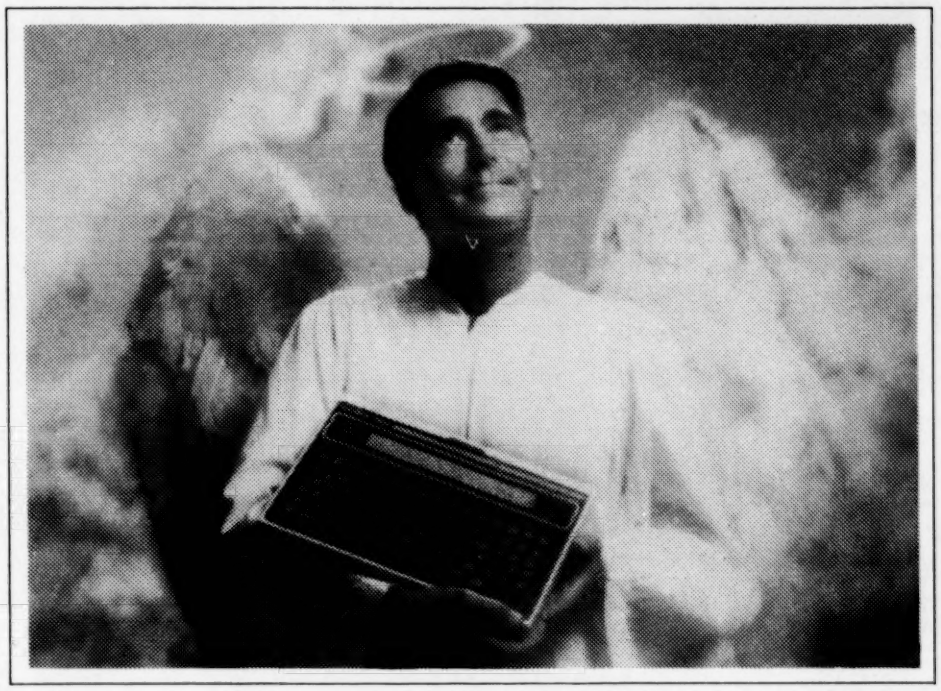
Of course, modern society has long since gotten used to "revolutions" in laundry detergents, underarm deodorants, floor waxes, and other consumer products. Exhausted in advertising slogans, the revolution image has lost much of its punch. Those who employ it to talk about computers and society, however, appear to make much more serious claims.

According to visionaries like Edward A. Feigenbaum and Pamela McCorduck *(The Fifth Generation)* or Murray Turoff and Starr Roxanne Hiltz *(The Network Nation)* industrial society, which depends on material production for its livelihood, is being supplanted by a society in which information services will enable people to satisfy their economic and social needs. As computation and communication technologies become less expensive and more convenient, all the people of the world, not just the wealthy, will use the wonderful services that information machines make available. Gradually, existing differences between rich and poor will evaporate.

Long lists of services are meant to suggest the coming utopia: interactive television, electronic funds transfer, computer-aided instruction, customized news service, electronic magazines, electronic mail, computer teleconferencing, on-line stock and weather reports, computerized yellow pages, shopping via home computer, and so forth. In the words of James Martin, writing in *Telematic Soci-*



Nothing speaks more plainly of the computer world than its own ads, here clipped from an ocean of computer magazines, courtesy of Madison Avenue.



AT&T (UPPER L.), TELERAM (LOWER L.), SOFTWORD (R.)

ety: "The electronic revolution will not do away with work, but it does hold out some promises: most boring jobs can be done by machines; lengthy commuting can be avoided; the opportunities for personal creativity will be unlimited."

In this interpretation, the prospects for participatory democracy have never been brighter, offering all the democratic benefits of the ancient Greek city-state, the Israeli kibbutz, and the New England town meeting. J.C.R. Licklider, a computer scientist at MIT, writes hopefully in a 1980 article called "Computers and Government": "The political process would essentially be a giant teleconference, and a campaign would be a months-long series of communications among candidates, propagandists, commentators, political action groups, and voters. The information revolution is bringing with it a key that may open the door to a new era of involvement and participation."

MYTHINFORMATION IN THE HIGH-TECH ERA

Taken as a whole, beliefs like these make up what I call *mythinformation:* the almost religious conviction that a widespread adoption of computers and communications systems, along with broad access to electronic information, will automatically produce a better world for humanity.

It is common for the advent of a new technology to provide occasion for flights of utopian fancy. During the last two centuries the factory system, railroads, the telephone, electricity, automobiles, airplanes, radio, television, and nuclear power have all figured prominently in the belief that a new and glorious age was about to begin (see sidebar, p. 26). But even within the great tradition of optimistic technophilia, current dreams of a "computer age" stand out as exaggerated and unrealistic. Because they have such broad appeal, and because they overshadow other ways of looking at the matter, these notions deserve closer inspection.

As is generally true of myths, the dreams contain elements of truth. What were once industrial societies are being transformed into service economies, a trend that emerges as a greater share of material production shifts to the developing countries, where labor costs are low and business tax breaks are lucrative. However, this shift does not mean that future employment possibilities will flow largely from the microelectronics and information-services industries, even though some service industries do depend on highly sophisticated computer and communications systems.

A number of studies, including those of the U.S. Bureau of Labor Statistics, suggest that the vast majority of new jobs will be menial service positions paying relatively low wages.

As robots and computer software absorb an increasing share of factory and office tasks, the "information society" will offer plenty of work for janitors, hospital orderlies, and fast-food helpers.

The computer savants correctly notice that computerization alters relationships of social power and control; however, the most obvious beneficiaries of this change are large transnational business corporations. While their "global reach" does not arise solely from the application of information technologies, such organizations are uniquely situated to exploit the new electronic possibilities for greater efficiency, productivity, command, and control. Other notable beneficiaries will be public bureaucracies, intelligence agencies, and ever-expanding military organizations.

Ordinary people are, of course, strongly affected by these organizations and by the rapid spread of new electronic systems in banking, insurance, taxation, work, home entertainment, and the like. They are counted on to be eventual eager buyers of hardware, software, and communications services.

But where is any motion toward increased democratization and social equality, or the dawn of a cultural renaissance? Current empirical studies of computers and social change — such as those described in *Computers and Politics* by James Danzige — suggest an increase in power by those who already have a great deal of power, an enhanced centralization of control by those already in control, and an augmentation of wealth by the already wealthy. If there is to be a computer revolution, it will most likely have a distinctly conservative character.

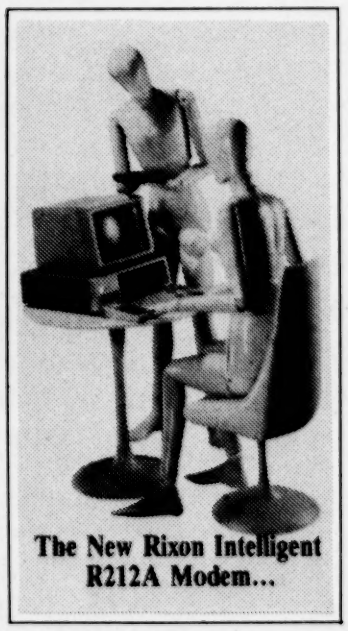
Granted, such prominent trends could be altered. A society strongly rooted in computer and telecommunications systems could incorporate participatory democracy, decentralized control, and social equality. However, such progress would involve concerted efforts to remove the many difficult obstacles blocking those ends, and the writings of computer enthusiasts seldom propose such deliberate action. Instead, they suggest that the good society will be a natural spin-off from the proliferation of computing devices. They evidently assume no need to place limits upon concentrations of power in the information age.

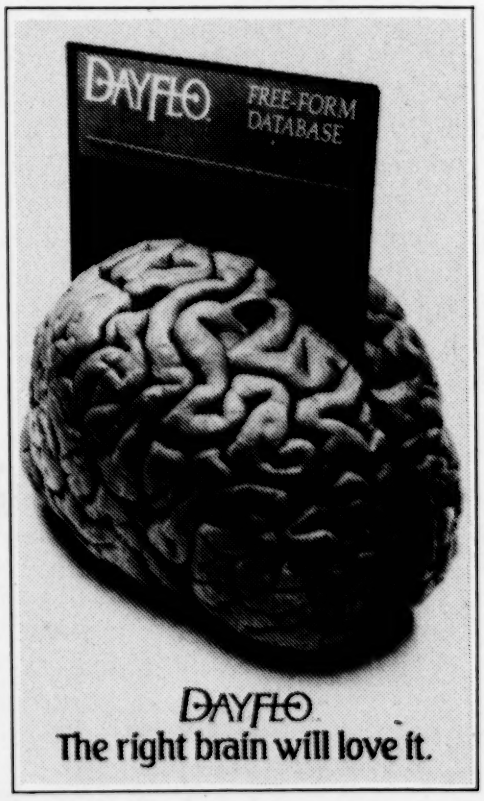
There is nothing new in this assumption. Computer romanticism strongly resembles a common nineteenth- and twentieth-century faith that expects to generate freedom, democracy, and justice through simple material abundance. From that point of view, there is no need for serious inquiry into the appropriate design of new institutions for the distribution of rewards and burdens. In previous versions of this conviction, the abundant (and therefore democratic) world would be found in a limitless supply of houses and consumer goods. Now "access to information" has moved to the top of the list.

PROBING THE KEY ASSUMPTIONS

The political arguments of computer romantics draw upon four key assumptions: 1) people

"A SERIOUS MISCONCEPTION AMONG COMPUTER ENTHUSIASTS IS THE BELIEF THAT DEMOCRACY IS LARGELY A MATTER OF DISTRIBUTING INFORMATION."





SYTEK (L.), RIXON (C.), DAYFLO (R.).

are bereft of information; 2) information is knowledge; 3) knowledge is power; and 4) increased access to information enhances democracy and equalizes social power.

1) Is it true that people face serious shortages of information? To read the literature on the computer revolution, one would suppose this to be a problem on a par with the energy crisis of the 1970s. The persuasiveness of this notion borrows from our sense that literacy, education, knowledge, well-informed minds, and the widespread availability of tools of inquiry are of unquestionable social value.

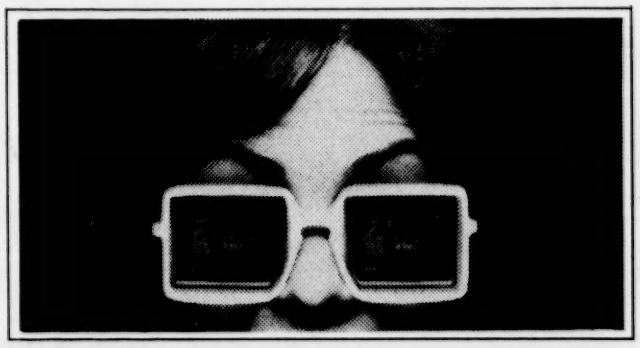
Alas, the idea is entirely faulty. It mistakes sheer supply of information for an educated ability to gain knowledge and act effectively. Even highly developed societies contain chronic inequalities in the distribution of education and intellectual skills. The U.S. Army must reject many of the young men and women it recruits because they cannot read military manuals.

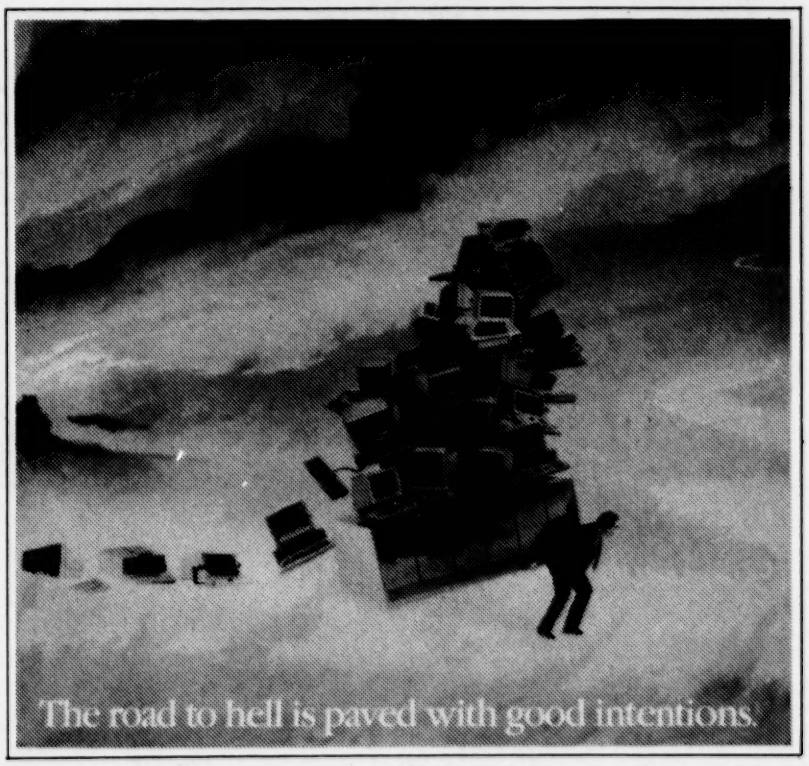
If the solution to problems of illiteracy and poor education were a question of information supply alone, then the best policy might be to increase the number of well-stocked libraries, especially in places where libraries do not presently exist. Of course, that would do little good unless people were sufficiently well-educated to use those libraries. Computer enthusiasts, however, are not known for their support of public libraries and schools; they call for *electronic information* carried by *networks.* To look to those instruments first while ignoring everything history has taught us about how to educate and stimulate a human mind is grave foolishness.

2) What is the "information" so cherished as knowledge? It is not understanding, enlightenment, critical thought, timeless wisdom, or the content of a well-educated mind. Looking closely at the writings of computer enthusiasts, "information" means enormous quantities of data manipulated by various kinds of electronic media, used to facilitate the transactions of large, complex organizations. In this context, the sheer quantity of information presents a formidable challenge. Modern organizations continually face "overload," a flood of data that threatens to become unintelligible. Computers provide one way to confront that problem; speed conquers quantity.

The information most crucial to modern organizations is highly time-specific. Data on stock market prices, airline traffic, weather conditions, international economic indicators, military intelligence, and public opinion polls are useful for very short periods of time.

"THERE IS NO AUTOMATIC POSITIVE LINK BETWEEN KNOWLEDGE AND POWER."





BYTEX (L.), MSP (TOP), DIPELT (R.).

Systems that gather, organize, analyze, and use electronic data must be closely tuned to the latest developments. Information is a perishable commodity.

But is it sensible to transfer this ideology, as many evidently wish, to all parts of human life? A recent *Business Week* article on home computers concluded: "Running a household is actually like running a small business. You have to worry about inventory control — of household supplies — and budgeting for school tuition, housekeepers' salaries, and all the rest." One begins to wonder how running a home was possible before microelectronics.

3) "As everybody knows, knowledge is power," wrote Dr. Feigenbaum. This attractive idea is highly misleading. Knowledge employed in particular circumstances may well help one act effectively — a citrus farmer's knowledge of frost conditions enables him to fight the harmful effects of cold snaps. But there is no automatic, positive link between knowledge and power, especially power in a social or political sense. At times, knowledge brings merely an enlightened impotence or paralysis. What conditions might enable ordinary folks to translate their knowledge into renewed power? It is a question computer enthusiasts ought to explore.

4) An equally serious misconception among computer enthusiasts is the belief that democracy is largely a matter of distributing information. This assertion plays on the valid beliefs that a democratic public should be open-minded and well-informed, and that totalitarian societies are evil because they dictate what people can know and impose secrecy to restrict freedom. But democracy is not founded primarily upon the availability of information. It is distinguished from other political forms by the recognition that the people as a whole are capable of, and have the right to, self-government.

There are many reasons why relatively low levels of citizen participation prevail in some modern democracies, including the United States. Perhaps opportunities to serve in a public office or influence policy are too limited; in that case, broaden the opportunities. Or perhaps choices placed before citizens are so pallid that boredom is a valid response; then improve the quality of those choices. But it is not reasonable to assume that a universal

UTOPIAN VISIONS FROM EARLIER TECHNOLOGICAL PERIODS

FROM THE AGE OF STEAM

Fellow Men! I promise to show the means of creating a paradise within ten years, where everything desirable for human life may be had by every man in superabundance, without labor, and without pay; where the whole face of nature shall be changed into the most beautiful of forms, and man may live in the most magnificent palaces, in all imaginable refinements of luxury, and in the most delightful gardens; where he may accomplish, without labor, in one year, more than hitherto could be done in thousands of years.
—J.A. Etzler, *The Paradise Within the Reach of All Men, with Labor, by Powers of Nature and Machinery* (1842)

FROM THE AGE OF ELECTRICAL POWER

Centralization has claimed everything for a century: the results are apparent on every hand. But the reign of steam approaches its end; a new stage in the industrial revolution comes on. Electric power, breaking away from its servitude to steam, is becoming independent. Electricity is a decentralizing form of power: it runs over distributing lines and subdivides to all the minutiae of life and need. Working with it, men may feel the thrill of control and freedom once again.
—Joseph K. Hart, *The Survey Graphic* No. 51, March 1, 1924

FROM THE AGE OF ELECTRONICS

The electric age of servomechanisms suddenly releases men from the mechanical and specialist servitude of the preceding machine age. As the machine and the motorcar released the horse and projected it onto the plane of entertainment, so does automation with men. We are suddenly threatened with the liberation that taxes our inner resources of self-employment and imaginative participation in society . . . Panic about automation as a threat of uniformity on a world scale is the projection into the future of mechanical standardization and specialism, which are now past.
—Marshall McLuhan, *Understanding Media* (1964)

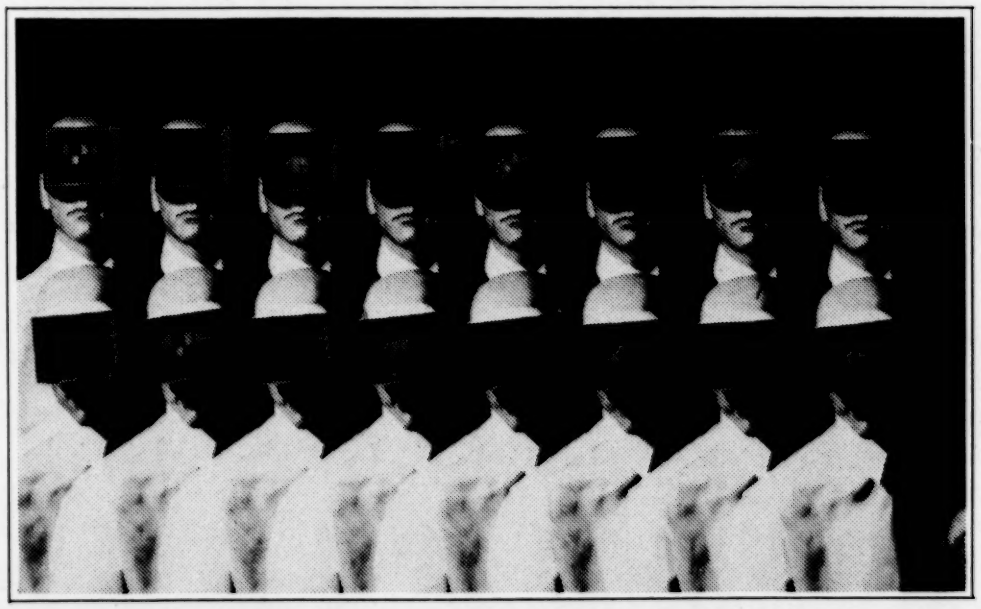
grid of sophisticated information machines, in itself, would stimulate a renewed sense of political involvement and participation.

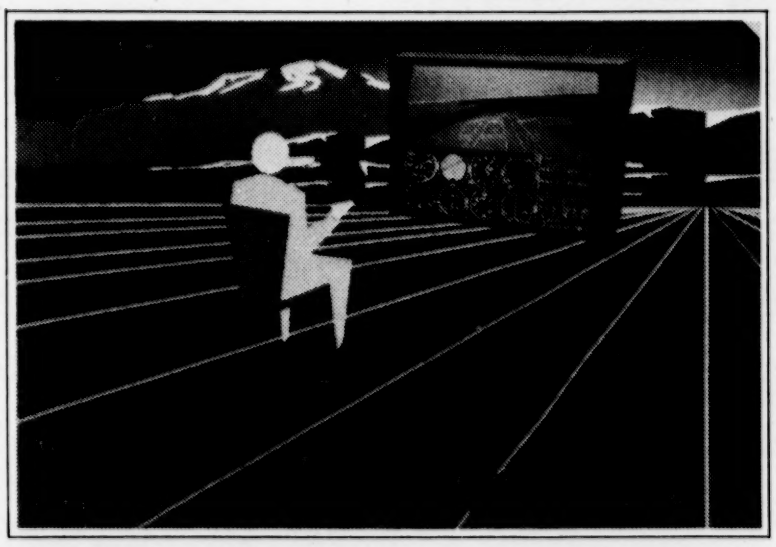
The role of television in modern politics suggests why this is so. Public participation in voting has steadily declined as television replaces the face-to-face politics of precincts and neighborhoods. The passive monitoring of electronic news makes citizens feel involved while releasing them from the desire to take an active part, and from any genuine political knowledge based on first-hand experience. The vitality of democratic politics depends on people's willingness to act together — to appear before each other in person, speak their minds, deliberate, and decide what they will do. This is considerably different from the model upheld as a breakthrough for democracy: logging onto one's computer, receiving the latest information, and sending back a digitized response. No computer enthusiasm is more poignant than the faith that the personal computer, as it becomes more sophisticated, cheaper, and more simple to use, will become a potent equalizer in society. Presumably, ordinary citizens equipped with microcomputers will counter the influence of large, computer-based organizations. This notion echoes the eighteenth- and nineteenth-century revolutionary belief that placing firearms in the hands of the people would overthrow entrenched authority. But the military defeat of the Paris Commune in 1871 made clear that arming the people may not be enough. Using a personal computer makes one no more powerful vis-a-vis, say, the U.S. National Security Agency than flying a hang glider establishes a person as a match for the U.S. Air Force.

THE LONG-TERM CONSEQUENCES

If the long-term consequences of computerization are anything like the ones commonly predicted, they will require rethinking of many fundamental conditions and institutions in social and political life. Three areas of concern seem paramount. First, as people handle more of their daily activities electronically — mail, banking, shopping, entertainment, travel plans, and so on — it becomes technically feasible to monitor these activities with unprecedented ease (see "Public Image," p. 32). An age rich in electronic information may achieve

"IF THERE IS TO BE A COMPUTER REVOLUTION IT WILL MOST LIKELY HAVE A DISTINCTLY CONSERVATIVE CHARACTER."





MACROTECH (TOP), LOGIC (L.), 3M (LOWER R.).

wonderful social conveniences at the cost of placing freedom — and the feeling of freedom — in a deep chill.

Second, a computerized world will renovate conditions of human sociability. Indeed, the point of many applications of microelectronics is to eliminate social layers that were previously needed. Computerized bank tellers have largely done away with local branch banks, which were places where people met and socialized. The so-called electronic cottage would operate well without the human interaction that characterizes office work.

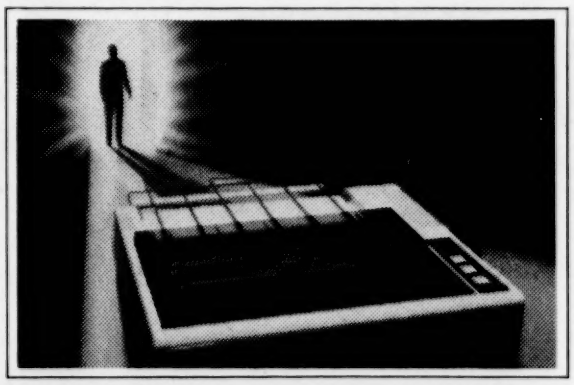
These developments pare away the face-to-face contact that once provided buffers between individuals and organized power. Workers who might previously have recognized a common grievance and acted together to remedy it are now deprived of such contact, and thus increasingly influenced by employers, news media, advertisers, and national political leaders. Where will we find new institutions to balance and mediate such power?

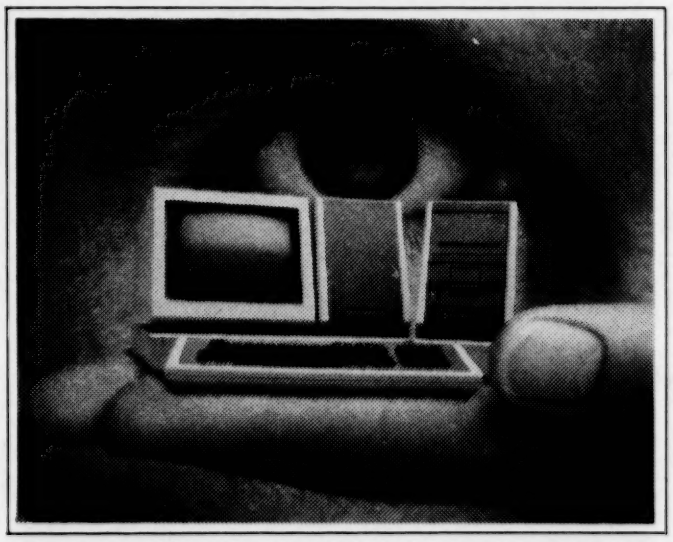
Third, computers, satellites, and telecommunications may recast the basic structure of political order, as they fulfill the modern dream of conquering space and time. These systems make possible instantaneous action anywhere on the globe without limits imposed by the location of the initiator. But humans and their societies have traditionally lived, acted, and found meaning within spatial and temporal limits. Microelectronics tends to dissolve these limits, thereby threatening the integrity of social and political forms that depend on them.

Transnational corporations of enormous size can now manage their activities efficiently across the whole surface of the planet. If it seems convenient, operations can be shifted from Sunnyvale to Singapore at the flick of a switch. In recent past, corporations have had to demonstrate at least some semblance of commitment to their geographical base; their public relations often stressed the fact that they were "good neighbors." But when organizations are located everywhere and nowhere, this commitment easily evaporates. Towns, cities, regions, and whole nations must swallow their pride and negotiate for favors. Political authority is gradually redefined.

By calling the changes of computerization "revolutionary," people tacitly acknowledge that these changes require reflection; they may even require strong public action to ensure a desirable outcome. Yet the occasions in our society for reflection, debate, and public choice are rare indeed. The important decisions are left in private hands inspired by narrowly focused economic motives. While it is widely recognized that these decisions have profound cumulative consequence for our common life, few seem prepared to own up to that fact. Some observers forecast that the computer revolution will be guided by new wonders in artificial intelligence. Its present course is influenced by something much more familiar: the absent mind. ■

"AN AGE RICH IN ELECTRONIC INFORMATION MAY ACHIEVE WONDERFUL SOCIAL CONVENIENCES AT THE COST OF PLACING FREEDOM IN A DEEP CHILL."





MAI (L.), EPSON (UPPER R.), CIES (LOWER R.).

JUST ME AND MY MACHINE

The New Solipsism

Last fall my wife Gail, a counselor at a private high school in California, took seven teenage girls on a tour of East Coast colleges, traveling several hundred miles with them in a van. "That must have been a noisy couple of weeks," I said to her when she returned. "No," she said, "it was very quiet. As soon as we got into the van, all the girls tuned in their individual Walkman tape players and listened silently until we stopped."

There they were in the same space, listening to different kinds of music, not talking to or engaged with each other. Nor is that situation unique. I once watched a poker game in which all four players were listening to separate Walkmans — one jazz, one rock, one country, one classical.

There is, I suppose, some virtue in this way of listening. Before the Walkman, we had the large portable tape player, nicknamed the "ghetto blaster," that forced passersby to listen to disco whether they wanted to or not. But at least the ghetto blaster maintained some semblance of communication between self and others. The Walkman is designed to eliminate that. You are alone with the machine and the central programming source.

A similar form of isolated consciousness appears in video game arcades. You find people intently playing games that involve shooting down space ships, gobbling dots, or shooting figures of opponents. Some games do enable players to take turns, and people do talk to each other in arcades. But often as not the player is oblivious to others, interacting solely with the machine and the central, automated programming source.

Ultimately, it seems to me, the experience tends to close the individual in on himself. Other people are not necessary to complete the feedback loop. The game can be completely absorbing indefinitely without the least reference to other people. In fact, a video game now under development will use galvanic skin response to enable one to think or emote the position of space ships on a video screen. This is a further step in what may be an inevitable progression toward breaking down the barriers between central automated programming sources and the innermost recesses of the human soul.

This pattern of isolated experience is already deeply entrenched in modern life. Psychiatrists frequently report that one major source of alienation within families is that family members watch TV rather than talk to one another. The communications media — broadcast television, the Walkman, and video games like PacMan — all discourage communication. In what ways will the sensibility spawned by these instruments make contact with the surrounding world? This question takes on greater significance with the widespread adoption of personal computers. People become engaged with computer programs as intensely as others are involved with video games. Developments like electronic news, education, banking, and even work, all available through information machines, create a strong impetus for people to dwell within themselves and not reach out. A central programming source can provide much of what a person needs. What will the consequences be for one's sense of self?

Perhaps an answer of sorts appears in the recent popularity of an idea that might be called the new solipsism. In philosophy, solipsism is the theory that the self is the only thing that can be known, or the only existent reality. The new solipsism is a conviction behind several movements in pop psychology or pop mysticism, such as Werner Erhardt's est, the idea that the self is responsible for its own experience. If you don't feel well, if the world torments you, you have no one to blame but yourself. If you want a pleasant, fulfilling existence, you must stop generating external barriers and acknowledge that you can control the content of your consciousness.

In some ways the new solipsism is simply an extension of good old-fashioned self-seeking individualism. But by marketing this idea and its accompanying training, est has won hundreds of thousands of disciples who believe that there are no social problems; the self generates all worldly ills and the remedy is strictly internal.

In itself, est will not become a dominant force in our society. But this moral sensibility is distinctly suited to a world in which most people spend a great deal of time staring into cathode-ray tubes. At the exact historical moment when science can greatly alter things and the power of technology-based institutions has reached unprecedented proportions, the doctrine arises that the self is responsible — not for the wise use of that power or the shape of those institutions, but simply for the self's own experience.

Why is this solipsism significant? Any debate over technological change assumes that there is a living moral sense shared by all of us, which will respond to arguments about what is right or wrong. But many forces in our world have combined to neutralize commonly shared moral understanding, creating the illusion that we live in self-contained, comfortably isolated worlds. Could it be that precisely when the most profound social choices must be made, the faculties that might enable us to make wise choices have been rendered inert? Will people be satisfied to monitor passively the events that change how they live, and not expect to be involved in any significant social decisions?

Where the sense of sociability and public concern have gone dead, one must seek ways to revitalize them. Whether we acknowledge it or not, we are all here together, and share a common fate.

—Langdon Winner

THE BACK OFFICE

POST-INDUSTRIAL FACTORIES

ITT AD

THE ELECTRONIC SWEAT-SHOP, RATHER THAN THE ELECTRONIC COTTAGE, IS THE NEW FORCE IN OUR LANDSCAPE AND WILL DIRECT URBAN FORM FOR THE NEXT DECADE.

by Peter Calthorpe

Right around the corner from Whole Earth headquarters, architect Peter Calthorpe works from a sunny back office (computerless) tucked in a pedestrian cul-de-sac. He is co-author of Sustainable Communities, *forthcoming from Sierra Club Books.*

—Kevin Kelly

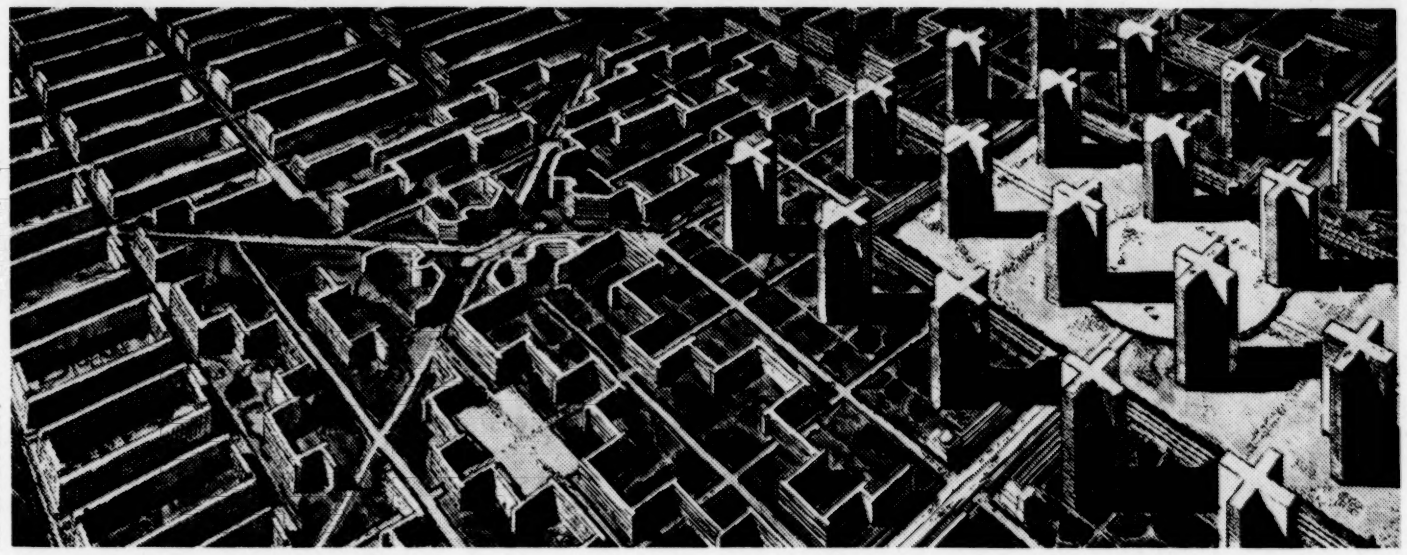
IMAGINE a single-story office building over eight acres in area, with desks 150 feet away from the nearest window. Fill it with computers, cathode ray tubes, and people making under $20,000 per year, surround it with a parking lot for 8,000 cars, and put it all at a remote freeway interchange. Here you have the "back office," the hottest new item in commercial real estate.

These buildings are the dark side of computerization, and a far cry from Alvin Toffler's electronic cottage. They segregate the low-paid workers from upper and middle management and place them in vast word- and number-processing factories. Bank of America, Pacific Telephone, AT&T, Mobil Oil, and Chevron, among others, are building cheap back offices in the suburbs to house their rote work, while keeping upper management and executives in their downtown financial-district headquarters.

In 1930 Le Corbusier, a revolutionary founder of the modern movement in architecture, created a vision of the city of the future which foreshadowed these trends. Called *Villa Radieuse,* "The Radiant City," it was a radical diagram of an efficient city based on two new technologies: the automobile and high-rise steel construction. The towers at the center of his plan were to house "the captains of industry," a cultural elite who could appreciate the austere beauty of his abstract geometries and rational

The Chevron Park Project in San Ramon, CA. The building without a courtyard at upper left is the computer Back Office: it houses 450 employees. Ten other buildings are under construction.

CHEVRON



LE CORBUSIER, CITY OF TOMORROW, 1930

The future of 1930. Le Corbusier, the grandfather of the Modern Movement in architecture, envisioned the new "Radiant City" in his book *City of Tomorrow*, which is dedicated to "AUTHORITY." Leaders would reside in the cluster of towers, ruling over citizens laboring in low-rise oblivion outside.

layout. In the outlying areas menial workers would live and work in low-rise oblivion, rarely commuting to the city center and not participating in the high culture and power it represented.

The back office is in fact the factory of a post-industrial culture. Its owners are the modern-day equivalents of Le Corbusier's captains of industry: financial "supermarkets," insurance companies, and communications giants. Already, since 1976, 2.6 million square feet of back office space has slipped across the Hudson from Manhattan into New Jersey. Twenty-three percent of them are banks, 24 percent financial institutions, 11 percent insurance companies, and 42 percent are communications corporations. Their employees are typically 80 percent clerical, 12 percent supervisory, and only 8 percent middle-management.

The target back office employee is the suburban housewife — college-educated, low-paid, non-unionized, and dependable. The location of the back office in outlying, secure white suburbs where real estate is affordable is selected to avoid the urban poor, who in interviews with executives are thought to lack a strong work ethic. The systems operate 24 hours a day; security, adjacent parking, and safe mass transit are prime requirements. Not unlike the megastructures depicted in the movie *Blade Runner,* the back office wants to be gigantic, remote, and secure, leaving ethnic neighborhoods to the old, abandoned industrial zones and urban periphery.

In a survey of criteria for back office locations, 47 major Manhattan corporations ranked cost first, followed by the quality of the labor pool and site safety. These buildings are cheap. Sixty-dollar-per-square-foot construction costs are typical, in contrast to the headquarters high-rise at about twice that figure. The low-rise building has a cheaper structure, the finishes are thin, and the huge volume decreases the most expensive part of a building, its skin. The chances for daylighting such a building are slim.

The large volume of the building matches the scale of the institution and the nature of its operations. The back office represents a shift to an environment designed for its machines rather than its people. The efficiency of large horizontal spaces uniformly lit, viewless, directionless, with climate-controlled environments and uniform work stations matches the rote work being performed. The electrical demands of the computers dwarf any climate needs of people, just as the presence of fiber-optic telephone cables is more important for site selection than the quality of the surroundings, its unique character, history, or beauty.

Just when we thought suburban sprawl may have run its course, limited by commute distances and land preservation, the computerized back office is now set to fuel another layer of suburban growth. Placing large employment centers at the remote edges of our metropolitan areas will spur matching housing subdivisions, shopping malls, and freeways. Areas hungry for a tax base and oblivious to land conservation are now competing for these cybernetic paper-pushing factories. Throughout the sunbelt, the forms are identical, homogenous, standardized, scaleless, and placeless. ■

PUBLIC IMAGE

by Larry Hunter

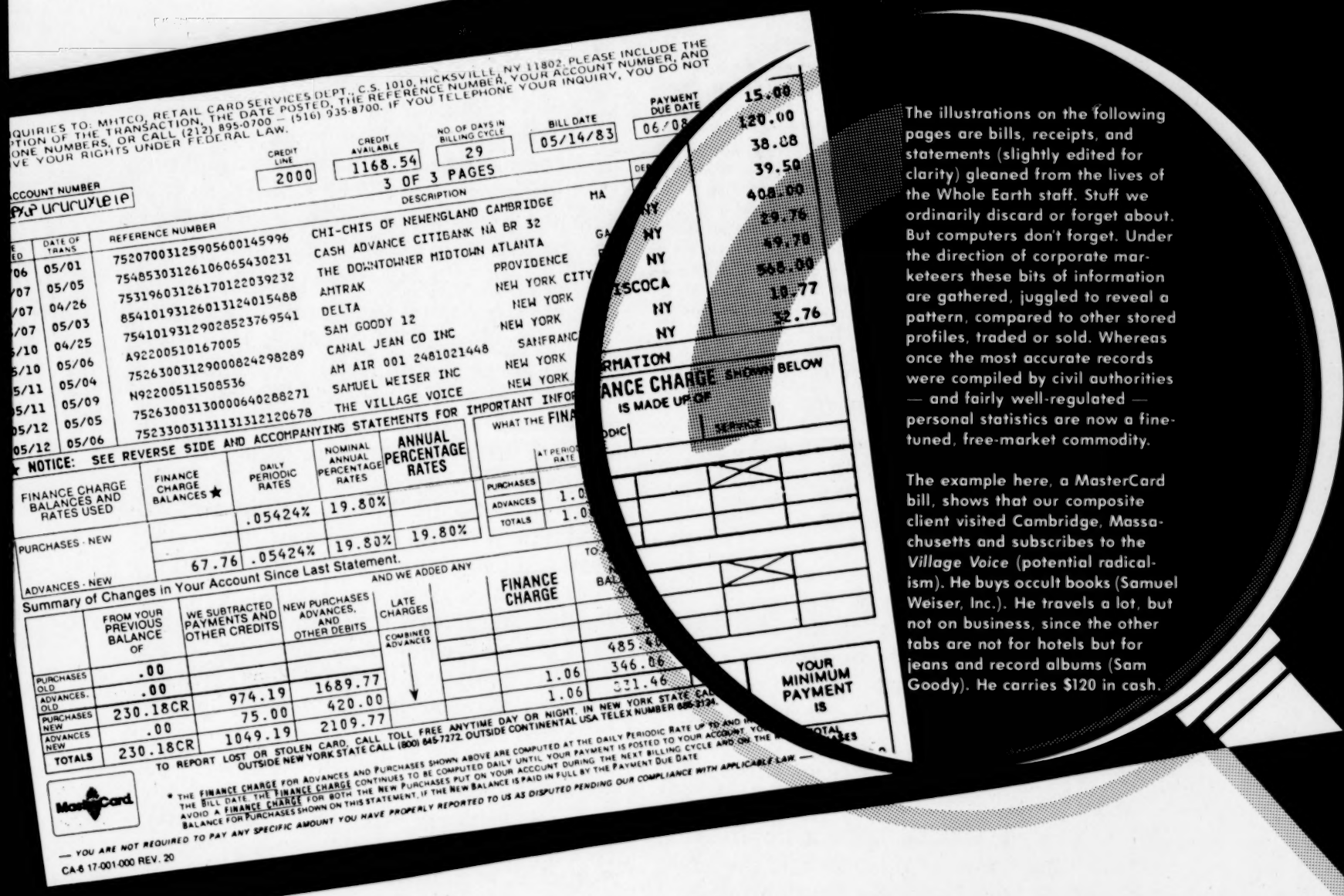
Every day you give out evidence about yourself. Computers can merge these clues into a remarkably complete image of your habits, identity, and thoughts.

Headed for a PhD in computer science, Larry Hunter has been playing with computers since he was ten. He uses a powerful, state-of-the-art workstation at Yale and telecommunicates to it from home on an itsy-bitsy lap computer. The encompassing reach of computers which he describes in this article has made two differences in his own life. It has granted him computer expertise to assist his favored local politicians in their campaign strategies, and it has frightened him into the habit of keeping his paper-life to a minimum, and withholding his ID and Social Security numbers from anyone who does not legally require them.

—Kevin Kelly

I LIVE IN YOUR FUTURE. As a graduate student in Artificial Intelligence at Yale University, I am now using computer equipment that will be commonplace five years from now. I have a powerful workstation on my desk, connected in a high-speed network to more than one hundred other such machines, and, through other networks, to thousands of other computers and their users. I use these machines not only for research, but to keep my schedule, to write letters and articles, to read nationwide electronic "bulletin boards," to send electronic mail, and sometimes just to play games. I make constant use of fancy graphics, text formatters, laser printers — you name it. My gadgets are both my desk and my window on the world. I'm quite lucky to have access to all these machines.

But with this privilege comes a certain sobriety: I've begun to contemplate some of the effects the computer will have on society. It is impossible to predict what our interconnected, information-oriented society will look like in detail, but some of the outlines are becoming clearer. The ubiquity and power of the computer blur the distinction between public and private information. Our revolution will not be in gathering data — don't look for TV cameras in your bedroom — but in analyzing the information that is already willingly shared. Without any conspiratorial snooping or Big Brother antics, we may find our actions, our lifestyles, and even our beliefs under increasing public scrutiny as we move into the information age.



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ACCOUNT NUMBER

3 OF 3 PAGES

DATE OF TRANS	REFERENCE NUMBER	DESCRIPTION	
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05/05	75485303126106065430231	CASH ADVANCE CITIBANK NA BR 32	GA
04/26	75319603126170122039232	THE DOWNTOWNER MIDTOWN ATLANTA	
05/03	85410193126013124015488	AMTRAK	PROVIDENCE
04/25	75410193129028523769541	DELTA	NEW YORK CITY
05/06	A92200510167005	SAM GOODY 12	NEW YORK
05/04	75263003129000824298289	CANAL JEAN CO INC	NEW YORK
05/09	N92200511508536	AM AIR 001 2481021448	SANFRANC
05/05	75263003130000640288271	SAMUEL WEISER INC	NEW YORK
05/06	75233003131131312120678	THE VILLAGE VOICE	NEW YORK

	15.00
	120.00
	38.08
	39.50
NY	408.00
NY	29.76
NY	49.78
ESCOCA	568.00
NY	10.77
NY	32.76

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PURCHASES · NEW		.05424%	19.80%	
ADVANCES · NEW	67.76	.05424%	19.80%	19.80%

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	AT PERIODIC RATE	
PURCHASES		
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TOTALS	1.0	

Summary of Changes in Your Account Since Last Statement.

	FROM YOUR PREVIOUS BALANCE OF	WE SUBTRACTED PAYMENTS AND OTHER CREDITS	NEW PURCHASES ADVANCES, AND OTHER DEBITS	LATE CHARGES AND WE ADDED ANY COMBINED ADVANCES	FINANCE CHARGE	BALANCE
PURCHASES OLD	.00					
ADVANCES OLD	.00					485.4
PURCHASES NEW	230.18CR	974.19	1689.77			346.06
ADVANCES NEW	.00	75.00	420.00		1.06	1.46
TOTALS	230.18CR	1049.19	2109.77		1.06	

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— YOU ARE NOT REQUIRED TO PAY ANY SPECIFIC AMOUNT YOU HAVE PROPERLY REPORTED TO US AS DISPUTED PENDING OUR COMPLIANCE WITH APPLICABLE LAW —

CA-6 17-001-000 REV. 20

The illustrations on the following pages are bills, receipts, and statements (slightly edited for clarity) gleaned from the lives of the Whole Earth staff. Stuff we ordinarily discard or forget about. But computers don't forget. Under the direction of corporate marketeers these bits of information are gathered, juggled to reveal a pattern, compared to other stored profiles, traded or sold. Whereas once the most accurate records were compiled by civil authorities — and fairly well-regulated — personal statistics are now a fine-tuned, free-market commodity.

The example here, a MasterCard bill, shows that our composite client visited Cambridge, Massachusetts and subscribes to the *Village Voice* (potential radicalism). He buys occult books (Samuel Weiser, Inc.). He travels a lot, but not on business, since the other tabs are not for hotels but for jeans and record albums (Sam Goody). He carries $120 in cash.

Profile of a Buyer

Shoppers who think they are only vague entries on some company's list might lose that anonymity if they hold Mastercard or Visa credit cards. A new service by Citicorp Credit Services, a Citicorp subsidiary, will provide businesses that accept Mastercard and Visa credit cards with a detailed profile of their customers. The data will come close to pinpointing the bank card shoppers' income, education, family, housing type and value, age, vocation, even "lifestyle."

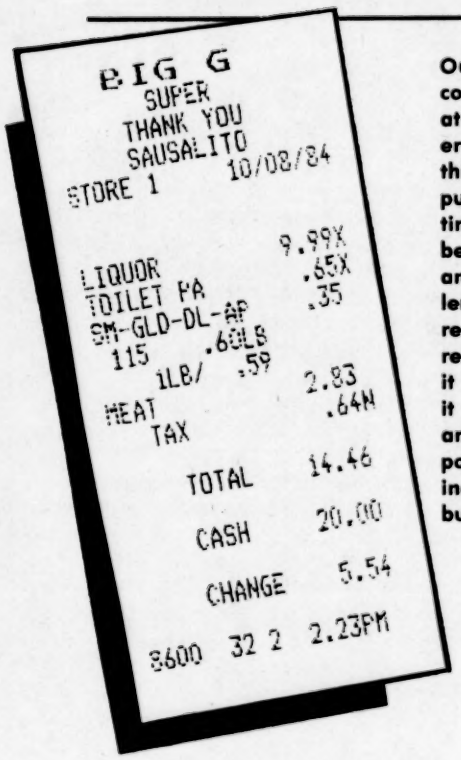
Alan Newman, vice president and marketing director for Citicorp Credit Services, said that until now, businesses that subscribed to bank cards have only been able to get generalized demographic profiles of those who use the cards. But an arrangement with Donnelley Marketing Information Services, a Dun & Bradstreet subsidiary, will allow Citicorp to combine Donnelley demographic data with Citicorp's own cardholder data, he says, "even to the very block of a community." —*New York Times,* 18 March 1984

How does Citicorp know what your lifestyle is? How can they sell such information without your permission? The answer is simple: You've been giving out clues about yourself for years. Buying, working, socializing, and travelling are acts you do in public. Your lifestyle, income, education, home, and family are all deducible from existing records. The information that can be extracted from mundane records like your VISA or MasterCard receipts, phone bill, and credit record is all that's needed to put together a remarkably complete picture of who you are, what you do, and even what you think.

BLOC MODELLING

A powerful technique used by managers of large amounts of data is called *bloc modelling.* The goal of bloc modelling is to evaluate how people fit into an organization or group, based on their relations with other members of the group. The primary use of this practice, which was developed more than a decade ago, has been to examine how employees fit into the firm where they work. Bell Labs, ABC, the Wharton School, and even the Institute for Social Management in Bulgaria are among those who have used the technique.

The mathematics and computations behind the process are complicated, but the underlying idea is simple: While the relationship between two people in an organization is rarely very informative by itself, when many pairs of relationships are connected, patterns can be detected. The people being modelled are broken up into groups, or *blocs.* The assumption made by modellers is that people in similar positions



Our local supermarket employs computerized laser scanners at the checkout. These generate itemized receipts, like this one which shows a large purchase of liquor and the time of day. Our client might be unjustly accused of having an undisclosed drinking problem. This store does not record customer ID numbers required to cash checks, but if it was one of those which did, it would rapidly accumulate an economic gold mine (and political gas pocket): an individual's extensive buying history.

behave similarly. Blocs aren't tightly knit groups. You may never have heard of someone in your bloc, but because you both share a similar relationship with some third party you are lumped together. Your membership in a bloc might become the basis of a wide variety of judgements, from who gets job perks to who gets investigated by the FBI.

Where does the initial data come from? In the office, it may be who you talk to on the intercom, whose phone calls you return (or don't return), who you eat lunch with, who you send your memos to, even who you play softball with. Fancy telephone systems, electronic mail, and bulletin boards make gathering this relational data even easier. When personal computers are on every desk, routine information about who says what to whom is automatically generated and easily collected. Employers and others can keep track of that mundane information, and save it in a database that can be bloc modelled later.

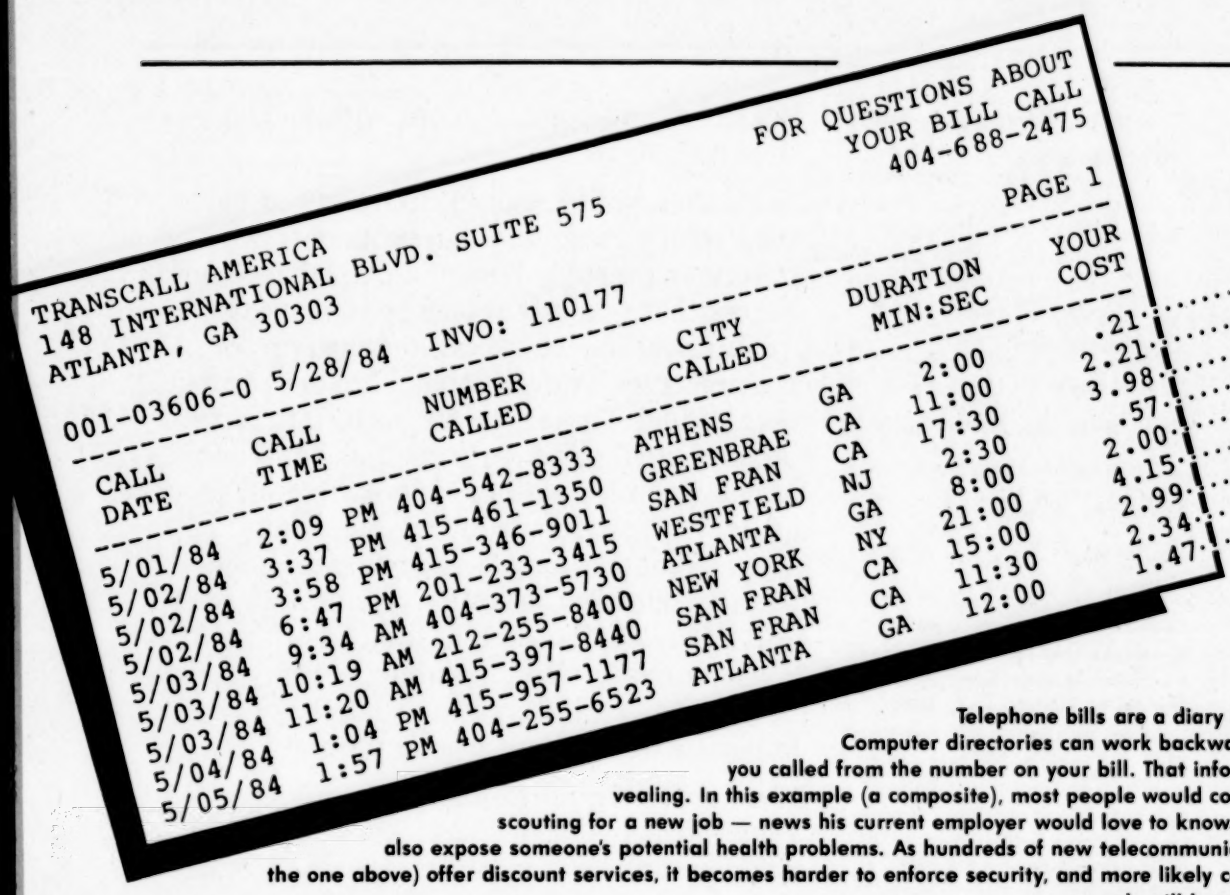
Bloc modelling is used to separate people, cliques, and whole organizations into categories which determine the way the modeller may ultimately treat the groups. While conceptually similar to the more familiar "redlining," it is unlike other kinds of discrimination, since the blocs found are generally inconspicuous, and the members may easily fail to recognize their common fate. Furthermore, the existing laws protecting privacy, such as those that guarantee individuals access to their own files, do not address bloc modelling. It is difficult to imagine what remedies might be devised for this new form of guilt by association.

WHEN IS PRIVATE INFORMATION PUBIC?

We live in a world of private and public acts. We consider what we do in our own bedrooms to be our own business; what we do on the street or in the supermarket is open for everyone to see. In the information age, our public acts disclose our private dispositions, even more than a camera in the bedroom would. This doesn't necessarily mean we should bring a veil of secrecy over public acts. The vast amount of public information both serves and endangers us.

To make this idea clear, I'd like to use an example invented by Jerry Samet, Professor of Philosophy at Bentley College. He suggests that, although we consider it a violation of privacy to look in somebody's window and notice what they are doing, we have no problem with the reverse: someone sitting in his living room looking *out* his window. If I'm looking out my window and I notice you walking down my street, I may notice that you are wearing a red sweater, holding hands with someone else, or heading towards the local bar. If I wanted to, I might write down what I saw out my window. Consider what happens if I write down everything I see out my window, and all my neighbors do, too. Suppose we shared notes and compiled the data we got just by looking out our own windows. When we sorted it all out, we would have detailed personal profiles of everyone we saw. If every move anyone made in public were recorded, correlated, and analyzed, the veil of anonymity protecting us from constant scrutiny would be torn away. Even if that record were never *used,* its very existence would certainly change the way we act in public. The idea that someone is always watching is no less threatening when the watching goes on in the supermarket, in the department store, and in the workplace than when it goes on in our homes.

The harmful consequences of just keeping personal profiles pale in comparison with the problems associated with their use. We don't have to look far into the future to imagine how such files could be used. There is a pressing example already apparent in two proposed additions to the National Crime Information Computer. The computer, or NCIC as it is commonly called, was set up to track wanted criminals and stolen property across state lines. When a policeman makes a routine traffic stop or otherwise confronts a stranger, the first thing he does is check the name through NCIC. If his name is in NCIC, the officer can search or arrest him, or take other discretionary action. The FBI now wants to add people to the database who have been accused of nothing, but are *suspected* of organized crime connections, terrorism, or narcotics possession, or are "known associates" of drug traffickers. Their avowed goal is to keep track of the whereabouts of such people. The FBI claims that this rep-



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ATLANTA, GA 30303

FOR QUESTIONS ABOUT YOUR BILL CALL 404-688-2475

PAGE 1

001-03606-0 5/28/84 INVO: 110177

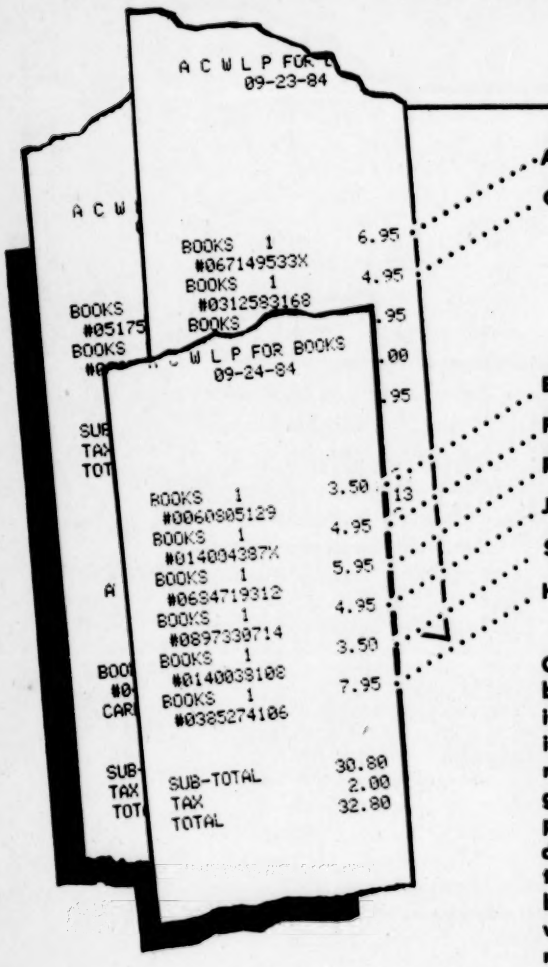
CALL DATE	CALL TIME	NUMBER CALLED	CITY CALLED		DURATION MIN:SEC	YOUR COST	
5/01/84	2:09 PM	404-542-8333	ATHENS	GA	2:00	.21	John Patton (friend)
5/02/84	3:37 PM	415-461-1350	GREENBRAE	CA	11:00	2.21	Ross Valley Health Clinic
5/02/84	3:58 PM	415-346-9011	SAN FRAN	CA	17:30	3.98	Robert Larsen, M.D., Psychiatrist
5/02/84	6:47 PM	201-233-3415	WESTFIELD	NJ	2:30	.57	Michael Patrick (brother)
5/03/84	9:34 AM	404-373-5730	ATLANTA	GA	8:00	2.00	Tom Werner (friend)
5/03/84	10:19 AM	212-255-8400	NEW YORK	NY	21:00	4.15	Geneva Employment Agency
5/03/84	11:20 AM	415-397-8440	SAN FRAN	CA	15:00	2.99	Horizon Personnel Service
5/04/84	1:04 PM	415-957-1177	SAN FRAN	CA	11:30	2.34	Kemp Employment Agency
5/05/84	1:57 PM	404-255-6523	ATLANTA	GA	12:00	1.47	L.M. Miller, Management Consultants

Telephone bills are a diary of your conversations. Computer directories can work backwards and deduce the name you called from the number on your bill. That information is extremely revealing. In this example (a composite), most people would conclude that our client is scouting for a new job — news his current employer would love to know. Telephone diaries can also expose someone's potential health problems. As hundreds of new telecommunications companies (like the one above) offer discount services, it becomes harder to enforce security, and more likely computerized telephone records will become an item of trade.

resents a "logical progression" of the crime center's efforts. The idea that associating with someone who gets arrested could get your name into the national crime database is scary enough. Worse yet, the Secret Service wants to get into the act. They want to sidestep the judicial process by directly entering the names of people they consider to be dangerous to the President or other high officials into NCIC without obtaining warrants. If the FBI and the Secret Service get their way, having the wrong friends or being on the wrong side of the Executive Branch could get your name into the computer, subjecting you to police harassment, surveillance, even detention. Since just adding a name to NCIC doesn't legally deprive anyone of liberty or property, constitutional due process constraints do not apply.

Why not make gathering this information against the law? Think of Samet's metaphor: do we really want to ban looking out the window? The information about groups and individuals that *is* public is public for a reason. Being able to write down what I see is fundamental to freedom of expression and belief, the freedoms we are trying to protect. Furthermore, public records serve us in very specific, important ways. We can have and use credit because credit records are kept. We can prevent the sale of handguns to convicted felons because criminal records are kept. Supermarkets must keep track of their inventories, and since their customers prefer that they accept checks, they keep information on the financial status of people who shop in their store. In short, keeping and using the kind of data that can be turned into personal profiles is fundamental to our way of life — we cannot stop *gathering* this information.

What we have to do is find a way to control its *use.* We need to make it possible to draw distinctions between the kinds of information processing, dissemination, and use we want to allow and the kinds we want to prohibit. Some uses of personal information are quite reasonable. Using conviction records to avoid selling guns to criminals is a legitimate use of personal data. Keeping track of who I call on the telephone and for how long is legitimate if the purpose is to bill me for those calls. Writing down what books I buy is fine, so long as the intent is to maintain the inventory at my local bookstore. There are a variety of traditional, necessary, and nonthreatening uses of personal information. Ideally, any use of information outside the scope of these traditional ones should require the knowledge and consent of the person the information is about. Marketing and direct advertising are not traditional uses of personal information, and should not be thought of as such. I should be able to choose whether or not I want my local bookstore to keep a list of the books I buy, even if they just want to mail me ads for new books they think I'd like. I should be able to prevent a company from selling my name and address to someone else without my permission. I don't want the FBI to be able to look at my consumer records and decide that my lifestyle fits their model of a subversive or a drug user. I certainly do not want employers to use bloc modelling to fire people on the basis of who they associate with, or politicians to use it to identify their "enemies." →



Anger: The Misunderstood Emotion

OK, Thinner Thighs

Excellent Women

Fifth Business

Roman Fever and Other Stories

Jack On the Gallows Tree

Smallbone Deceased

Harriet Hume

Cash register receipts from a bookstore that has computerized its inventory. Each book is itemized by its industry code ISBN number. We used a software program called IN-SEARCH (*WESC*, p. 152) to quickly access Dialog's database "Books in Print" in order to decode the ISBN numbers into book titles. If customers shop with credit cards their account numbers can be linked to the reading history of an individual. Even emotion can be tallied. From the book titles we have a clue that our client may be quite angry.

INFORMATION AS PROPERTY

People under scrutiny ought to be able to exert some control over what other people do with that personal information. Our society grants individuals control over the activities of others primarily through the idea of property. A reasonable way to give individuals control over information about them is to vest them with a *property interest* in that information. Information about me is, in part, my property. Other people may, of course, also have an interest in that information. Citibank has some legitimate interests in the information about me that it has gathered. When my neighbor writes down that I was wearing a red sweater, both of us should share in the ownership of that information.

What does it mean to own information? To share in such ownership? How can existing laws about property be interpreted to make judgements about the use and control of information? These questions must ultimately be answered by the legislators who draft laws giving information property status, and the courts who interpret those laws. We can begin to imagine some of the implications of such an approach. What makes information different from other kinds of property is that it is intangible: it cannot be touched, held, or seen directly. The same information can be in two places at once. Other than that, information is like other kinds of property: it can have monetary value, it can be produced, improved, or degraded, and one can share, withhold, or transfer it to others.

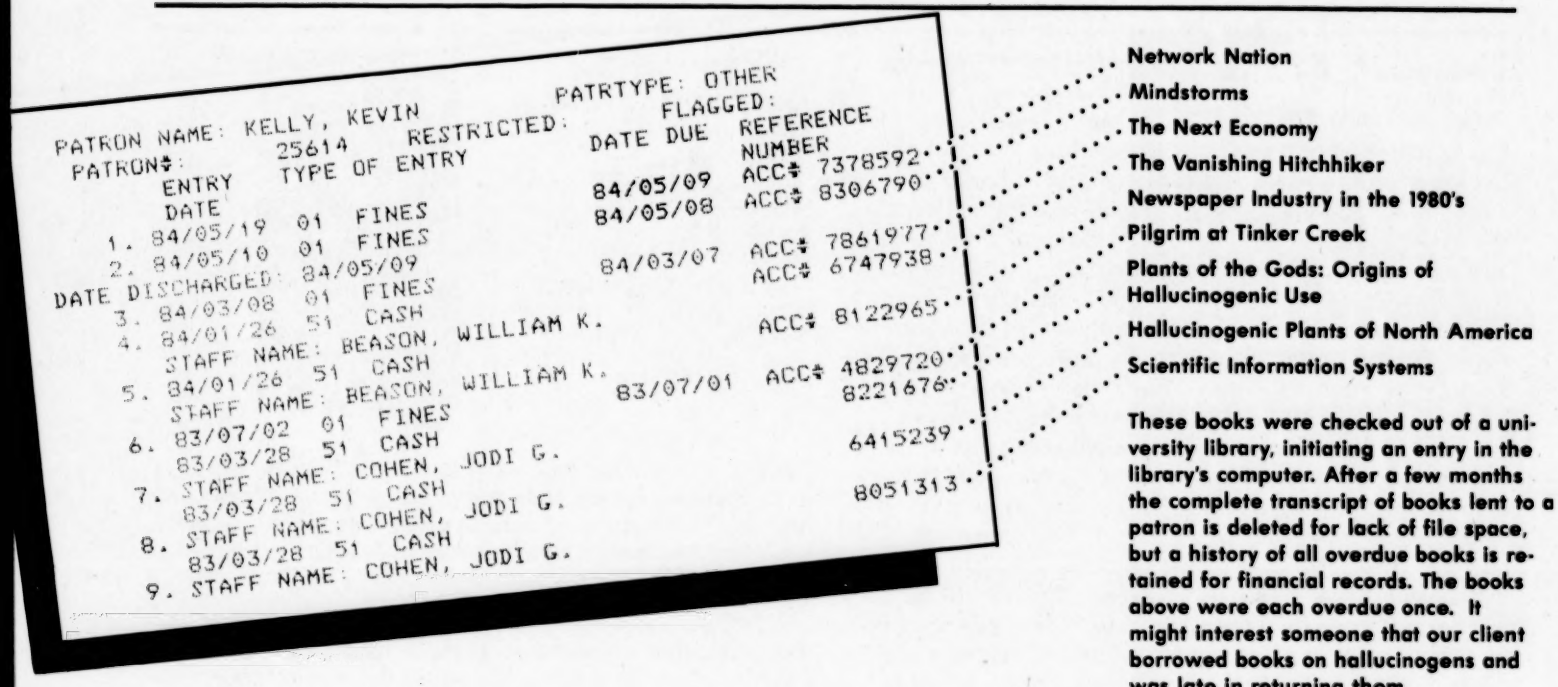
Is information enough like property to be successfully integrated into property law? The process has already begun in many legislatures. Across the country laws are being passed that make unauthorized access, duplication, or tampering with information stored in computers a crime. These laws are deemed necessary because existing burglary statutes don't apply to copying information, or looking at it, especially if the access was by remote computer. When computer data is copied by an unauthorized outsider that action resembles burglary, and it is treated as such in these new laws. If it is like burglary, then something is being stolen. In this context, information is already being implicitly treated as if it were property.

If we are to treat information as property *explicitly,* some of our ideas about property will have to be changed. Information can be stolen by copying it, leaving the original behind. If information is merely what is known, how can it be taken away? How can vesting the individual with the rights associated with property, particularly the right of excluding others from that property, be specifically translated into control over analysis of data? How can we define information so that knowledge in a computer is property that can be controlled, but knowledge inside someone's head is not? Enforcement presents another problem: how can we tell if someone is using personal information illicitly? The example of copyright law suggests that, while finding small abuses of intangible property is difficult, finding major violations is no harder than other law enforcement tasks.

SEARCH AND SEIZURE OF INFORMATION

Treating information as property has an additional benefit. As the law currently stands, information isn't property, but computers are. The owner of the computer has been held to control everything "inside" his computer. That means that if I write a personal note on my office workstation, my employer has the right to read it. By contrast, he has no right to read a note I write on company stationery with a company pen and put in my (company owned) desk. More importantly, my employer can give permission to law enforcement agencies to go on a fishing expedition through my files in his computer, which, metaphorically, gives the police the right to rummage at random through any employee's "desk." This is not hypothetical; a case of just such abuse was reported by Larry Layton, a government employee.

Layton worked in a Defense Department office (DARCOM) which was fully electronic. Most



These books were checked out of a university library, initiating an entry in the library's computer. After a few months the complete transcript of books lent to a patron is deleted for lack of file space, but a history of all overdue books is retained for financial records. The books above were each overdue once. It might interest someone that our client borrowed books on hallucinogens and was late in returning them.

employees had computers and all used electronic mail to communicate with each other. There were over 3000 users with access to the system, and 500 in-house users of internal workplace computers. All writing and interoffice communication, as well as other office support, was done on a computer. At least three times, the Army Criminal Investigation Division, in conjunction with the FBI, obtained complete dumps of all the workplace automation computers without any type of court order or specification of what they were looking for, other than "wrongful use of government property." A "complete dump" means that every bit of information was printed out and examined. Using the analogy to desks, it is as if the FBI went through every employee's desk looking at every piece of paper, through every address book, reading every memo and every piece of mail. After finding one person who had a recipe in an electronic mail message, and another who had a baby sitter's phone number in a telephone number file, the FBI read each his rights and threatened retribution. The legal staff of the operation advised the managers that the searches were legal since computer files don't fall under any of the same protections that, say, telephone usage does. The searches have resulted in the employees refraining from using the system for communication, electronic mail, filing, and many other applications.

This sort of witch-hunt is only the beginning. Electronic mail typically goes through several computers before reaching its final destination. The owner of each of those computers apparently has the full legal right to read, copy, and disseminate anything contained in his computer, including that mail. Since the U.S. Postal Service, MCI, and a host of other similar entities are operating electronic mail services, one might think that electronic mail had the same protection and privacy as a paper letter or a phone call. It does not. It is, for the time being, completely open to anyone through whose computer it passes. We must extend the special status of the letter and the phone call to all forms of electronic communication. The idea of *information as property* will protect that information with the rules of search and seizure that apply to other kinds of property. It will provide the connection between sending a letter and sending electronic mail necessary to protect the content of our communication.

PUBLIC IMAGES, LIMITED

It is time our legal technicians turned their attention to framing answers in the language of the law. We will need to define many gray areas, and insure that we tread carefully in these sensitive areas of personal information. I think we can specify the uses we consider traditional, and separate those we consider new or threatening. Lawyers, computer scientists, businessmen, and an informed public must work together to bring to our legal system a carefully crafted new framework for thinking about information.

Computers and electronic communication are ushering in a new age. We will be able to talk to more people in more ways than ever before. The dramatic increase in our ability to communicate may be the glue that we need to hold our fragile world together. Computers also help us analyze all the information we can gather and exchange, helping us to understand the world around us. It is precisely those abilities which make computers threatening, too. Soon celebrities and politicians will not be the only ones who have public images but no private lives — it will be all of us. We must take control of the information about ourselves. We should own our personal profiles, not be bought and sold by them. ■

The Rise of the Computer State

JERRY MANDER: ***New York Times*** *reporter David Burnham has written a very scary book about the surveillance potentials of computerized society. Computers make possible what the author says is likely, in fact, already underway: a very high degree of Orwellian tracking of each of us. Justified as effective for fighting criminals and terrorists, the FBI, CIA, NSA, local police and private security agencies have already created vast interlocked computer networks. You and your organization are probably to be found somewhere in them. What's more, these networks are only a half step (and one or two remaining laws) from being able to interlock their data with your social security file, your telephone, your zip code, your IRS records, your employer, your bank accounts, your insurance company, your charge cards and someday, perhaps, your own dear home computer, the one that makes you "free." Thus far, as the author describes, civil libertarians have held the line against the meshing of all identification systems into one all-knowing central computer. But these are the Reagan years, and technology has a way of fulfilling itself.*

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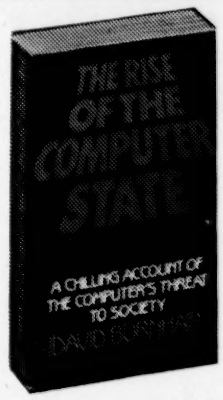
Consider the small but sophisticated computer General Motors has installed on the V8-6-4 model Cadillac automobile. "Your Cadillac," the 1981 owner's manual boasts, "is equipped with a digital fuel injection system which monitors the exhaust stream with an oxygen sensor. The oxygen sensor signals the control unit to adjust the air-fuel ratio as necessary."

The manual further notes that the "Check Engine" light in the instrument panel "is designed to warn you if the system has detected any faults. If the light comes on and stays on while driving, the car should be taken to a Cadillac dealer as soon as possible for system inspection and maintenance. If the light comes on and goes off, it is an indication that a temporary problem has cleared itself. While it is not as critical that the vehicle be brought in to a dealer for inspection immediately, the dealer may at a later date be able to determine what trouble had occurred and if any maintenance is necessary."

The Rise of the Computer State
David Burnham
1984; 282 pp.
$7.95
postpaid from:
Random House
Attn.: Mail Order Dept.
400 Hahn Road
Westminster, MD 21157
or Computer Literacy



But *Electronics Engineering News*, a trade publication, discerned another possible motive in the tiny onboard electronic spy: to ascertain owner negligence over warranty claims. The publication noted that the computer allowed the dealer to determine how many times the car has been driven faster than 85 miles an hour and also how many times the engine was started after the "Check Engine" message first lit up on the dashboard.

•

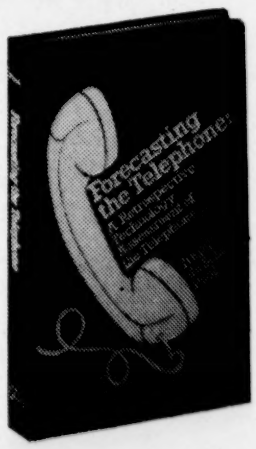
In 1980 the Office of Technology Assessment sent a questionnaire to the fifty states about how they managed their criminal-history records. One question was whether they checked the accuracy of the records in their files. Four out of five of the forty-nine states answering this question responded that they had never conducted record quality audits. . . .

The astounding finding that only one out of five of the states has ever sought to audit and purge the information in their criminal-history files may explain why so many of the records are inaccurate or incomplete.

Forecasting the Telephone

JERRY MANDER: *One of a series of studies financed by the National Science Foundation and managed by M.I.T. under the heading "Retrospective Technology Assessment," this is a collection of hundreds of predictions as to how the telephone would change society. Many of them date to the mid-1800s, when the phone was invented, and some are as recent as 1940. Predictions are divided into such categories as effects upon the economy, politics, resource use and the environment, social structure, mores, learning and culture, conceptions of self and the universe, and patterns of human settlement. Sources of the forecasts include private and corporate papers, journals, public statements, news reports and some poetic visions. The author comments on many of the predictions and concludes that the best forecasting was done, not surprisingly, by business. Industry people wanted to know every possible use and every possible change for marketing purposes. The book is revelatory and an amazing amount of fun. The Retrospective Technology Assessment series also includes reports on waste water sewage disposal technology, the transatlantic cable, the airport and the mass production of electricity, among others.*

Forecasting the Telephone
Ithiel de Sola Pool
1983; 162 pp.
$24.50
postpaid from:
ABLEX Publishing Corp.
355 Chestnut St.
Norwood, New Jersey
07648
or Computer Literacy



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Recognition of how the telephone contributed to a revolution in modern architecture, namely the creation of skyscrapers, appears as early as 1902 in an article in *Telephony*. General Carty used the same arguments in 1908.

> It may sound ridiculous to say that Bell and his successors were the fathers of modern commercial architecture — of the skyscraper. But wait a minute. Take the Singer Building, the Flatiron, the Broad Exchange, the Trinity, or any of the giant office buildings. How many messages do you suppose go in and out of those buildings every day. Suppose there was no telephone and every message had to be carried by a personal messenger. How much room do you think the necessary elevators would leave for offices? Such structures would be an economic impossibility.

•

The telephone will favor the growth of large firms.

For one thing, the telephone company itself rapidly became a corporate giant. By 1912 telephony was the fourth largest industry in the United States. Not only was AT&T large (as were also its sister organizations in other countries); it was well managed, and one of the fountainheads of modern theories of scientific management.

More important, the existence of a telephone network facilitated the creation of great industrial complexes having activities in many locations. Indeed that is a better way of describing the process than trying to fit it to the simple categories of centralization or decentralization. Bringing dispersed activity under one management was centralization, but permitting an organization's activities to be geographically separated is decentralization.

Indeed this dual process of concentration and dispersion of power was observed at the time. Casson commented in 1910 that "the telephone arrived in time to prevent big corporations from becoming unwieldy and aristocratic."

The Second Self

STEVEN LEVY: *As a psychologist who has taught at MIT since 1976, Sherry Turkle was well-placed to do the extensive field work that produced* ***The Second Self****. And what field work! Six years of it — interviews with hundreds of children, video game addicts, college students, hackers, personal computer hackers, and the cream of Artificial Intelligence academia. To her credit, the result of all this is not a droning statistical regurgitation of her encounters, but a well-reasoned treatise centered around her contention that the computer offers us humans a new and powerful way to see ourselves. Turkle calls it a Rorschach.*

She starts by showing us that the computer stimulates little kids to talk philosophy, and ends with a non-alarmist view of how Artificial Intelligence advances will bring a human-as-machine metaphor into common usage. Her perceptions, backed with long chunks of speech from her subjects (first names only given here), are provocative, reasonable, and sometimes witty. I was particularly pleased with her chapter on hackers, because her classical ethnographic approach led her to some of the same conclusions that I had reached, through a classical journalistic approach, while researching my own book, ***Hackers****.*

•

Children use a psychological discourse to talk about other things than computers. One five-year-old told me that a cloud is alive "because it gets sad. It cries when it rains." Another five-year-old said, "The sun is alive because it has smiles. People paint smiles on the sun." But if an eight-year-old argues that clouds or the sun are alive, the reasons given are almost always related to their motion — their way of moving across the sky and the fact that they seem to do so of their own accord. By contrast, as children become older and more sophisticated their arguments about the computer's aliveness become focused on increasingly refined psychological distinctions. . . . The computer provokes children to find ways either to deny it the status of a living being or to grant it a special kind of life. In the process it forces them to think about how machine minds and human minds are different and so enters into the development of psychological reasoning. It enters into thinking about mind: about computers' minds, other people's minds, and one's own mind.

•

Itself seemingly perfect, the computer evokes anxiety about one's own perfectability. There is pressure from a machine that leaves no one and no other being to blame. It is hard to walk away from the perfect mirror, from the perfect test. It is hard to walk away from a video game on which you could do better next time. . . .

•

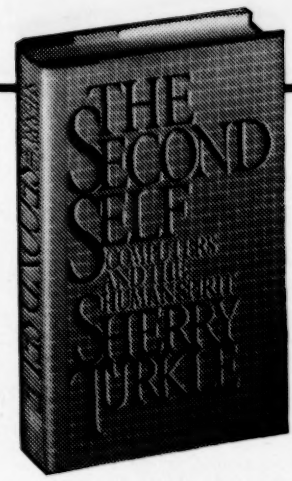
When the film [*Tron*] is over and the lights go on I see Marvin Minsky. Minsky has been charmed. "That was great," he says. "That's a whole lot better than bits! I am in the middle of writing a paper which proposes to outlaw the whole idea of bits. It's no way to think about what goes on inside of a computer."

I ask Minsky what he wants to put in place of the bits. He answers, with a look that makes it clear that the answer should be evident, "A society, of course, just like in *Tron*."

•

The hackers illustrate another facet of our emerging relationships with machines. Their response to the computer is artistic, even romantic. They want their programs to be beautiful and elegant expressions of their uniqueness and genius. They recognize one another not because they belong to the same "profession," but because they share an urgency to create in their medium. They relate to one another not just as technical experts, but as creative artists. The Romantics wanted to escape rationalist egoism by becoming one with nature. The hackers find soul in the machine — they lose themselves in the idea of mind building mind and in the sense of merging their minds with a universal system. When nineteenth-century Romantics looked for an alternative to the mechanism and competition of society, they looked to a perfect society of two, "perfect friendship," or "perfect love." This desire for fusion has its echo today, although in a new and troubling form. Instead of a quest for an idealized person, now there is the computer as a second self.

The Second Self
(Computers
and the Human Spirit)
Sherry Turkle
1984; 362 pp.
$19.45
postpaid from:
Simon and Schuster
Mail Order Dept.
1230 Avenue of
the Americas
New York, NY 10020
or Computer Literacy



Neuromancer

SZANTO: *This novel's main field of combat is the electro-neural network of the world in the middle of the next century. What distinguishes* ***Neuromancer*** *from run-of-the-mill science fiction is the exceptional quality of the writing and the vitality of the characters, but most of all the depth of thought in capturing a future world and the underside of the computer revolution that gives it shape. The main characters carry out their combat in "cyberspace," an electronically-created realm of hallucination. Stealing via computer networks is in the foreground, while the seedy, corrupt side of Japan and the urban matrix of the U.S. set the background. Imagine an outlying space colony dominated by dope-smoking Rastafarians who come to the rescue in a beat-up old space tug called the* Marcus Garvey*. Imagine an artificial intelligence known as Wintermute, a cybernetic spider, manipulating human pawns in its search for electronic union with a mysterious other. This is the world and the people that the Dashiell Hammett of the next century will be writing about.*

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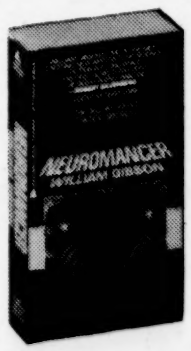
Her destination was one of the dubious software rental complexes that lined Memory Lane. There was a stillness, a hush. Booths lined a central hall. The clientele were young, few of them out of their teens. They all seemed to have carbon sockets planted behind the left ear, but she didn't focus on them. The counters that fronted the booths displayed hundreds of slivers of microsoft, angular fragments of colored silicon mounted under oblong transparent bubbles on squares of white cardboard. Molly went to the seventh booth along the south wall. Behind the counter a boy with a shaven head stared vacantly into space, a dozen spikes of microsoft protruding from the socket behind his ear.

Neuromancer
William Gibson
1984; 271 pp.
$3.70
postpaid from:
Ace Science Fiction
Book Mailing Service
P. O. Box 690
Rockville Centre,
NY 11571
or Whole Earth Access



THE MACHINE STOPS

by E. M. Forster
illustrated by
Matt Wuerker

THE AIR-SHIP

Imagine if you can, a small room, hexagonal in shape, like the cell of a bee. It is lighted neither by window nor by lamp, yet it is filled with a soft radiance. There are no apertures for ventilation, yet the air is fresh. There are no musical instruments, and yet, at the moment that my meditation opens, this room is throbbing with melodious sounds. An arm-chair is in the centre, by its side a reading-desk — that is all the furniture. And in the arm-chair there sits a swaddled lump of flesh — a woman, about five feet high, with a face as white as fungus. It is to her that the little room belongs.

An electric bell rang.

The woman touched a switch and the music was silent.

"I suppose I must see who it is," she thought, and set her chair in motion. The chair, like the music, was worked by machinery, and it rolled her to the other side of the room, where the bell still rang importunately.

"Who is it?" she called. Her voice was irritable, for she had been interrupted often since the music began. She knew several thousand people; in certain directions human intercourse had advanced enormously.

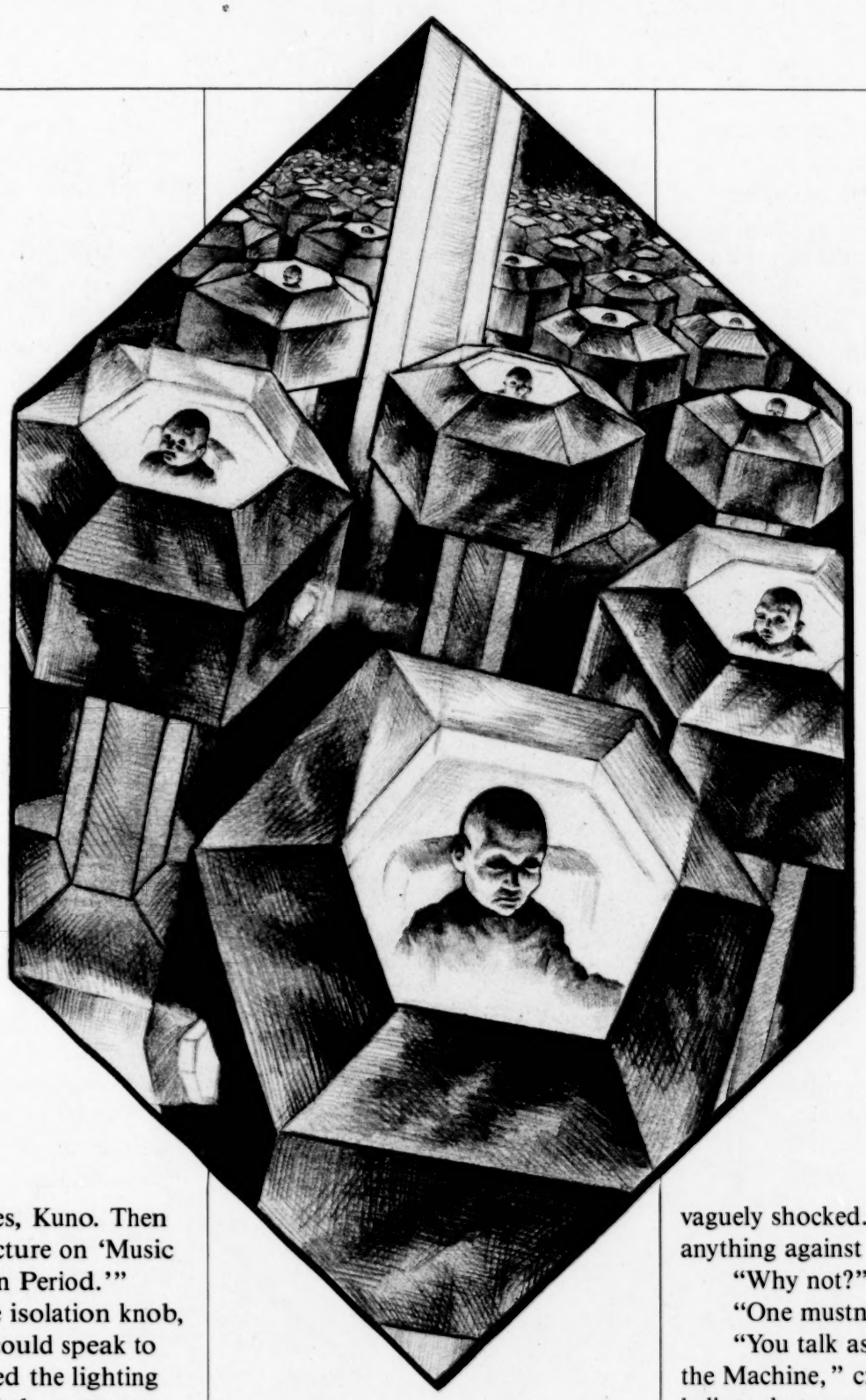
But when she listened into the receiver, her white face wrinkled into smiles, and she said:

"Very well. Let us talk, I will isolate myself. I do not expect anything important will happen for the next five minutes — for I can give

*This story of the ultimate electronic cottage was written in 1909. Nothing I have read makes me so nervous about my own fondest computer fantasies. The author is the famed British novelist (*Howard's End, *1910;* A Passage to India, *1924). The story appears in* The Eternal Moment and Other Stories, *by E. M. Forster, copyright 1929 by Harcourt Brace Jovanovich, Inc.; renewed 1956 by E. M. Forster. It is still in print from Harcourt Brace Jovanovich, Inc., who kindly gave us permission to reprint.*

Editor Jay Kinney came across "The Machine Stops" in a relevant special issue of an interesting Christian magazine. The Fall 1983 number of Epiphany *is entirely about the Computer Revolution: "Behind the playful and beneficient facade of the computer is a technology raging out of control, and dangerously uncritical acceptance of its promises is bringing about its swift infiltration into every dimension of our lives." The editors fear "a subtle, yet obvious, subrogation of the Absolute God by the cult of the meta-machine." The quarterly* Epiphany *costs $16/year from P. O. Box 14727, San Francisco, CA 94114; the computer issue is $5.75 postpaid.*

Forster was 30 in 1909. Are there any 30-year-olds now writing with this kind of insight? —*Stewart Brand*



you fully five minutes, Kuno. Then I must deliver my lecture on 'Music during the Australian Period.'"

She touched the isolation knob, so that no one else could speak to her. Then she touched the lighting apparatus, and the little room was plunged into darkness.

"Be quick!" she called, her irritation returning. "Be quick, Kuno; here I am in the dark wasting my time."

But it was fully fifteen seconds before the round plate that she held in her hands began to glow. A faint blue light shot across it, darkening to purple, and presently she could see the image of her son, who lived on the other side of the earth, and he could see her.

"Kuno, how slow you are."

He smiled gravely.

"I really believe you enjoy dawdling."

"I have called you before, mother, but you were always busy or isolated. I have something particular to say."

"What is it, dearest boy? Be quick. Why could you not send it by pneumatic post?"

"Because I prefer saying such a thing. I want —"

"Well?"

"I want you to come and see me."

Vashti watched his face in the blue plate.

"But I can see you!" she exclaimed. "What more do you want?"

"I want to see you not through the Machine," said Kuno. "I want to speak to you not through the wearisome Machine."

"Oh, hush!" said his mother, vaguely shocked. "You mustn't say anything against the Machine."

"Why not?"

"One mustn't."

"You talk as if a god had made the Machine," cried the other. "I believe that you pray to it when you are unhappy. Men made it, do not forget that. Great men, but men. The Machine is much, but it is not everything. I see something like you in this plate, but I do not see you. I hear something like you through this telephone, but I do not hear you. That is why I want you to come. Come and stop with me. Pay me a visit, so that we can meet face to face, and talk about the hopes that are in my mind."

She replied that she could scarcely spare the time for a visit.

"The air-ship barely takes two days to fly between me and you."

"I dislike air-ships."

"Why?"

"I dislike seeing the horrible brown earth, and the sea, and the

stars when it is dark. I get no ideas in an air-ship."

"I do not get them anywhere else."

"What kind of ideas can the air give you?"

He paused for an instant.

"Do you not know four big stars that form an oblong, and three stars close together in the middle of the oblong, and hanging from these stars, three other stars?"

"No, I do not. I dislike stars. But did they give you an idea? How interesting; tell me."

"I had an idea that they were like a man."

"I do not understand."

"The four big stars are the man's shoulders and his knees. The three stars in the middle are like the belts that men wore once, and the three stars hanging are like a sword."

"A sword?"

"Men carried swords about with them, to kill animals and other men."

"It does not strike me as a very good idea, but it is certainly original. When did it come to you first?"

"In the air-ship — "

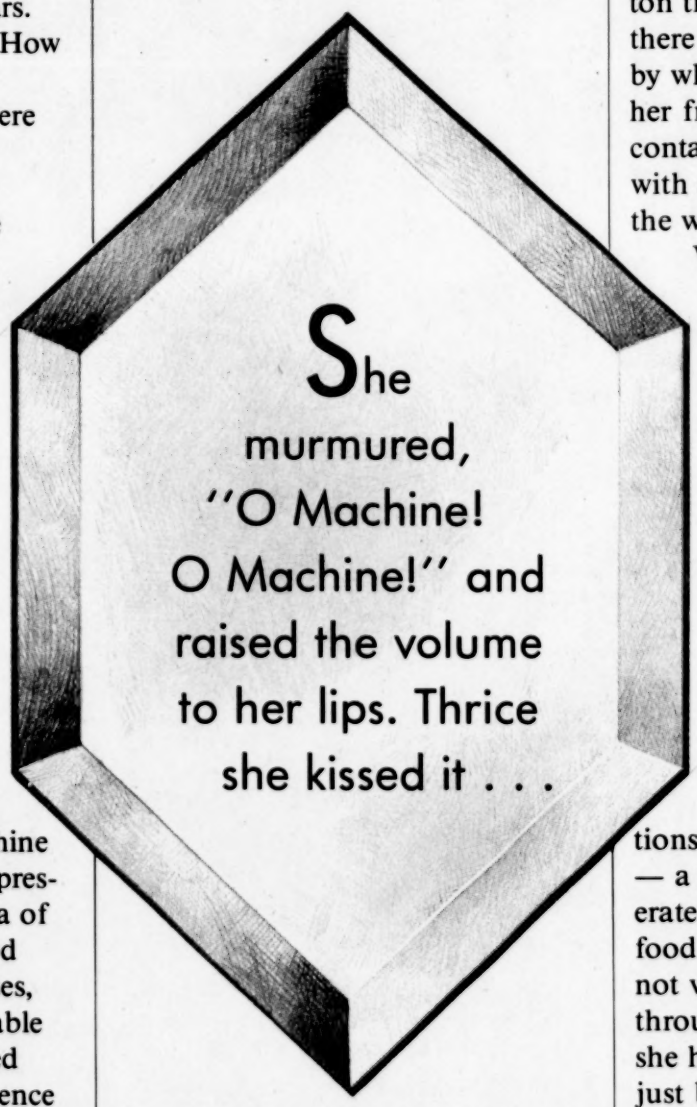
He broke off, and she fancied that he looked sad. She could not be sure, for the Machine did not transmit *nuances* of expression. It only gave a general idea of people — an idea that was good enough for all practical purposes, Vashti thought. The imponderable bloom, declared by a discredited philosophy to be the actual essence of intercourse, was rightly ignored by the Machine, just as the imponderable bloom of the grape was ignored by the manufacturers of artificial fruit. Something "good enough" had long since been accepted by our race.

"The truth is," he continued, "that I want to see these stars again. They are curious stars. I want to see them not from the air-ship, but from the surface of the earth, as our ancestors did, thousands of years ago. I want to visit the surface of the earth."

She was shocked again.

"Mother, you must come, if only to explain to me what is the harm of visiting the surface of the earth."

"No harm," she replied, controlling herself. "But no advantage. The surface of the earth is only dust and mud, no life remains on it, and you would need a respirator, or the cold of the outer air would kill you. One dies immediately in the outer air."



"I know; of course I shall take all precautions."

"And besides — "

"Well?"

She considered, and chose her words with care. Her son had a queer temper, and she wished to dissuade him from the expedition.

"It is contrary to the spirit of the age," she asserted.

"Do you mean by that, contrary to the Machine?"

"In a sense, but — "

His image in the blue plate faded.

"Kuno!"

He had isolated himself.

For a moment Vashti felt lonely.

Then she generated the light, and the sight of her room, flooded with radiance and studded with electric buttons, revived her. There were buttons and switches everywhere — buttons to call for food, for music, for clothing. There was the hot-bath button, by pressure of which a basin of (imitation) marble rose out of the floor, filled to the brim with a warm deodorised liquid. There was the cold-bath button. There was the button that produced literature. And there were of course the buttons by which she communicated with her friends. The room, though it contained nothing, was in touch with all that she cared for in the world.

Vashti's next move was to turn off the isolation-switch, and all the accumulations of the last three minutes burst upon her. The room was filled with the noise of bells, and speaking-tubes. What was the new food like? Could she recommend it? Had she had any ideas lately? Might one tell her one's own ideas? Would she make an engagement to visit the public nurseries at an early date? — say this day month.

To most of these questions she replied with irritation — a growing quality in that accelerated age. She said that the new food was horrible. That she could not visit the public nurseries through press of engagements. That she had no ideas of her own but had just been told one — that four stars and three in the middle were like a man: she doubted there was much in it. Then she switched off her correspondents, for it was time to deliver her lecture on Australian music.

The clumsy system of public gatherings had been long since abandoned; neither Vashti nor her audience stirred from their rooms. Seated in her arm-chair she spoke, while they in their arm-chairs heard her, fairly well, and saw her, fairly well. She opened with a humorous account of music in the pre-Mongolian epoch, and went on to describe the great outburst of song that followed the Chinese conquest. Remote and primeval as were the methods of

I-San-So and the Brisbane school, she yet felt (she said) that study of them might repay the musician of today: they had freshness; they had, above all, ideas.

Her lecture, which lasted ten minutes, was well received, and at its conclusion she and many of her audience listened to a lecture on the sea; there were ideas to be got from the sea; the speaker had donned a respirator and visited it lately. Then she fed, talked to many friends, had a bath, talked again, and summoned her bed.

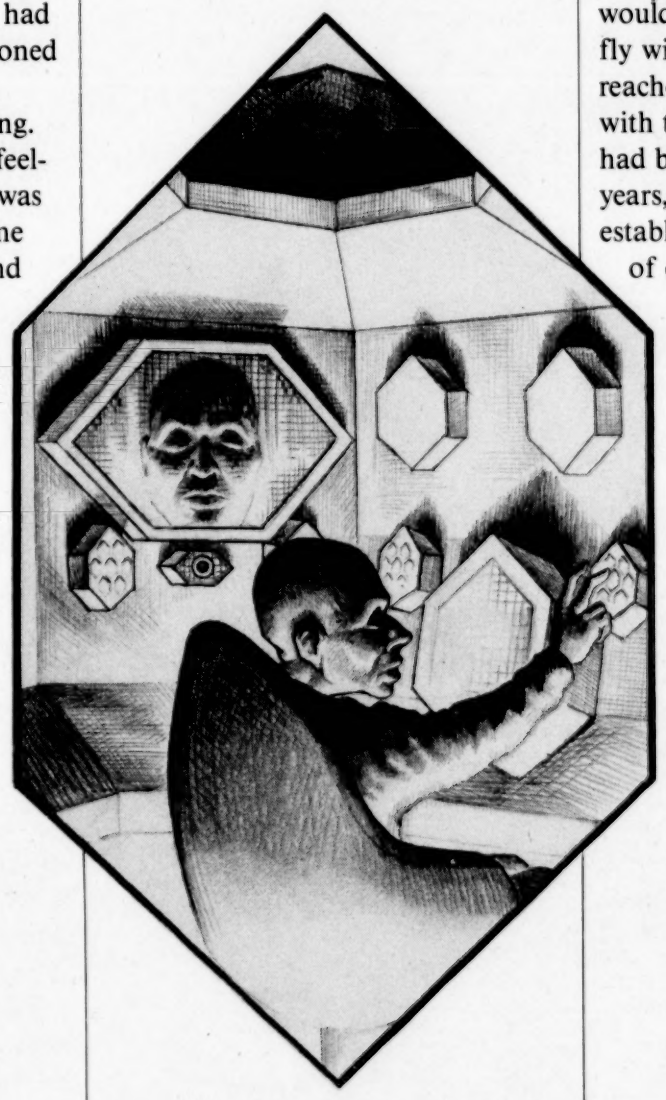
The bed was not to her liking. It was too large, and she had a feeling for a small bed. Complaint was useless, for beds were of the same dimension all over the world, and to have had an alternative size would have involved vast alterations in the Machine. Vashti isolated herself — it was necessary, for neither day nor night existed under the ground — and reviewed all that had happened since she had summoned the bed last. Ideas? Scarcely any. Events — was Kuno's invitation an event?

By her side, on the little reading desk, was a survival from the ages of litter — one book. This was the Book of the Machine. In it were instructions against every possible contingency. If she was hot or cold or dyspeptic or at a loss for a word, she went to the book, and it told her which buttons to press. The Central Committee published it. In accordance with a growing habit, it was richly bound.

Sitting up in the bed, she took it reverently in her hands. She glanced round the glowing room as if someone might be watching her. Then, half ashamed, half joyful, she murmured, "O Machine! O Machine!" and raised the volume to her lips. Thrice she kissed it, thrice inclined her head, thrice she felt the delirium of acquiescence. Her ritual performed, she turned to page 1367, which gave the times of the departure of the airships from the island in the southern hemisphere, under whose soil she lived, to the island in the northern hemisphere, whereunder lived her son.

She thought, "I have not the time."

She made the room dark and slept; she awoke and made the room light; she ate and exchanged ideas with her friends, and listened to music and attended lectures; she made the room dark and slept.



Above her, beneath her, and around her, the Machine hummed eternally; she did not notice the noise, for she had been born with it in her ears. The earth, carrying her, hummed as it sped through silence, turning her now to the invisible sun, now to the invisible stars. She awoke and made the room light.

"Kuno!"

"I will not talk to you," he answered, "until you come."

"Have you been on the surface of the earth since we spoke last?"

His image faded.

Again she consulted the book.

She became very nervous and lay back in her chair palpitating. Think of her as without teeth or hair. Presently she directed the chair to the wall, and pressed an unfamiliar button. The wall swung apart slowly. Through the opening she saw a tunnel that curved slightly, so that its goal was not visible. Should she go to see her son, here was the beginning of the journey.

Of course she knew all about the communication-system. There was nothing mysterious in it. She would summon a car and it would fly with her down the tunnel until it reached the lift that communicated with the air-ship station: the system had been in use for many, many years, long before the universal establishment of the Machine. And of course she had studied the civilisation that had immediately preceded her own — the civilisation that had mistaken the functions of the system, and had used it for bringing people to things, instead of for bringing things to people. She had not seen it since her last child was born. It curved — but not quite as she remembered; it was brilliant — but not quite as brilliant as a lecturer had suggested. Vashti was seized with the terrors of direct experience. She shrank back into the room, and the wall closed up again.

"Kuno," she said, "I cannot come to see you. I am not well."

Immediately an enormous apparatus fell on to her out of the ceiling, a thermometer was automatically inserted between her lips, a stethoscope was automatically laid upon her heart. She lay powerless. Cool pads soothed her forehead. Kuno had telegraphed to her doctor.

So the human passions still blundered up and down in the Machine. Vashti drank the medicine that the doctor projected into her mouth, and the machinery retired into the ceiling. The voice of Kuno was heard asking how she felt.

"Better." Then with irritation: "But why do you not come to me instead?"

"I cannot leave this place."

"Why?"

"Because, any moment, something tremendous may happen."

"Have you been on the surface of the earth yet?"

"Not yet."

"Then what is it?"

"I will not tell you through the Machine."

She resumed her life.

But she thought of Kuno as a baby, his birth, his removal to the public nurseries, her one visit to him there, his visits to her — visits which stopped when the Machine had assigned him a room on the other side of the earth. "Parents, duties of," said the book of the Machine, "cease at the moment of birth. P. 422327483." True, but there was something special about Kuno — indeed there had been something special about all her children — and, after all, she must brave the journey if he desired it. And "something tremendous might happen." What did that mean? The nonsense of a youthful man, no doubt, but she must go. Again she pressed the unfamiliar button, again the wall swung back and she saw the tunnel that curved out of sight. Clasping the book, she rose, tottered on to the platform, and summoned the car. Her room closed behind her: the journey to the northern hemisphere had begun.

Of course it was perfectly easy. The car approached and in it she found arm-chairs exactly like her own. When she signalled, it stopped, and she tottered into the lift. One other passenger was in the lift, the first fellow creature she had seen face to face for months. Few travelled in these days, for, thanks to the advance of science, the earth was exactly alike all over. Rapid intercourse, from which the previous civilisation had hoped so much, had ended by defeating itself. What was the good of going to Pekin when it was just like Shrewsbury? Why return to Shrewsbury when it would be just like Pekin? Men seldom moved their bodies; all unrest was concentrated in the soul.

The air-ship service was a relic from the former age. It was kept up, because it was easier to keep up than to stop it or to diminish it, but it now far exceeded the wants of the population. Vessel after vessel would rise from the vomitories of Rye or of Christchurch (I use the antique names), would sail into the crowded sky, and would draw up the wharves of the south — empty. So nicely adjusted was the system, so independent of meteorology, that the sky, whether calm or cloudy, resembled a vast kaleidoscope whereon the same patterns periodically recurred. The ship on which Vashti sailed started now at sunset, now at dawn. But always, as it passed above Rheims, it would neighbour the ship that served between Helsingfors and the Brazils, and every third time it surmounted the Alps, the fleet of Palermo would cross its track behind. Night and day, wind and storm, tide and earthquake, impeded man no longer. He had harnessed Leviathan. All the old literature, with its praise of Nature, and its fear of Nature, rang false as the prattle of a child.

Men seldom moved their bodies; all unrest was concentrated in the soul.

Yet as Vashti saw the vast flank of the ship, stained with exposure to the outer air, her horror of direct experience returned. It was not quite like the air-ship in the cinematophote. For one thing, it smelt — not strongly or unpleasantly, but did smell, and with her eyes shut she should have known that a new thing was close to her. Then she had to walk to it from the lift, had to submit to glances from the other passengers. The man in front dropped his Book — no great matter, but it disquieted them all. In the rooms, if the Book was dropped, the floor raised it mechanically, but the gangway to the air-ship was not so prepared, and the sacred volume lay motionless. They stopped — the thing was unforeseen — and the man, instead of picking up his property, felt the muscles of his arm to see how they had failed him. Then some one actually said with direct utterance: "We shall be late" — and they trooped on board, Vashti treading on the pages as she did so.

Inside, her anxiety increased. The arrangements were old-fashioned and rough. There was even a female attendant, to whom she would have to announce her wants during the voyage. Of course a revolving platform ran the length of the boat, but she was expected to walk from it to her cabin. Some cabins were better than others, and she did not get the best. She thought the attendant had been unfair, and spasms of rage shook her. The glass valves had closed, she could not go back. She saw, at the end of the vestibule, the lift in which she had ascended going quietly up and down, empty. Beneath those corridors of shining tiles were rooms, tier below tier, reaching far into the earth, and in each room there sat a human being, eating, or sleeping, or producing ideas. And buried deep in the hive was her own room. Vashti was afraid.

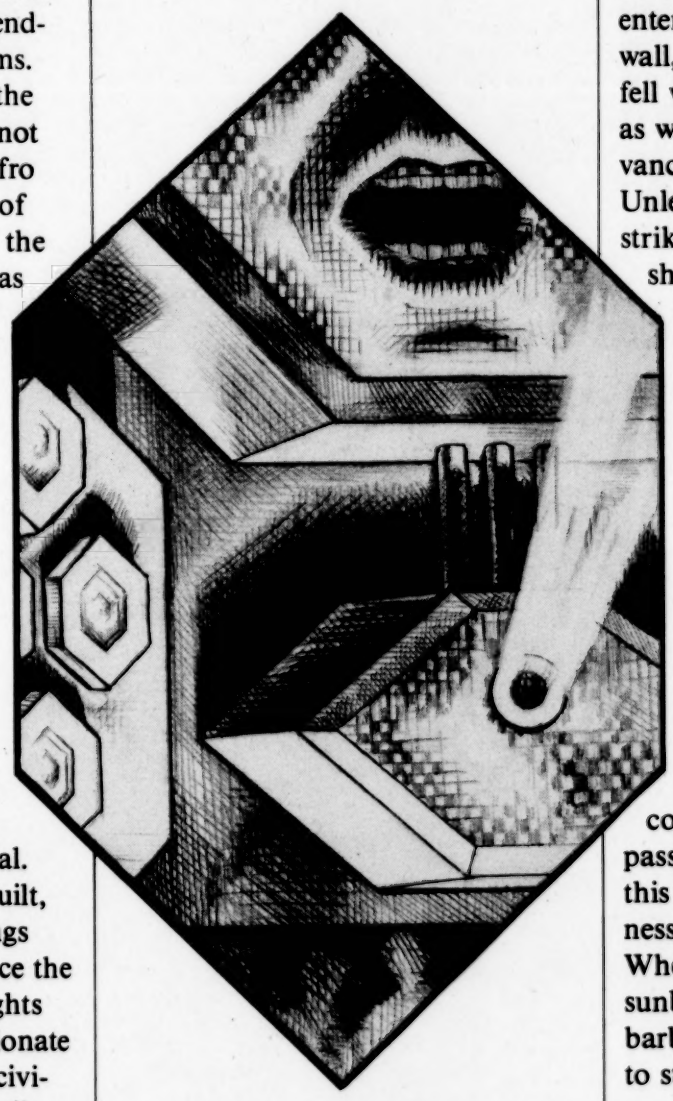
"O Machine! O Machine!" she murmured, and caressed her Book, and was comforted.

Then the sides of the vestibule

seemed to melt together, as do the passages that we see in dreams, the lift vanished, the Book that had been dropped slid to the left and vanished, polished tiles rushed by like a stream of water, there was a slight jar, and the air-ship, issuing from its tunnel, soared above the waters of a tropical ocean.

It was night. For a moment she saw the coast of Sumatra edged by the phosphorescence of waves, and crowned by light-houses, still sending forth their disregarded beams. These also vanished, and only the stars distracted her. They were not motionless, but swayed to and fro above her head, thronging out of one skylight into another, as if the universe and not the air-ship was careening. And, as often happens on clear nights, they seemed now to be in perspective, now on a plane; now piled tier beyond tier into the infinite heavens, now concealing infinity, a roof limiting for ever the visions of men. In either case they seemed intolerable. "Are we to travel in the dark?" called the passengers angrily, and the attendant, who had been careless, generated the light, and pulled down the blinds of pliable metal. When the air-ships had been built, the desire to look direct at things still lingered in the world. Hence the extraordinary number of skylights and windows, and the proportionate discomfort to those who were civilised and refined. Even in Vashti's cabin one star peeped through a flaw in the blind, and after a few hours' uneasy slumber, she was disturbed by an unfamiliar glow, which was the dawn.

Quick as the ship had sped westwards, the earth had rolled eastwards quicker still, and had dragged back Vashti and her companions towards the sun. Science could prolong the night, but only for a little, and those high hopes of neutralising the earth's diurnal revolution had passed, together with hopes that were possibly higher. To "keep pace with the sun," or even to outstrip it, had been the aim of the civilisation preceding this. Racing aeroplanes had been built for the purpose, capable of enormous speed, and steered by the greatest intellects of the epoch. Round the globe they went, round and round, westward, westward, round and round, amidst humanity's applause. In vain. The globe went eastward quicker still, horrible accidents occurred, and the Committee of the Machine, at the



time rising into prominence, declared the pursuit illegal, unmechanical, and punishable by Homelessness.

Of Homelessness more will be said later.

Doubtless the Committee was right. Yet the attempt to "defeat the sun" aroused the last common interest that our race experienced about the heavenly bodies, or indeed about anything. It was the last time that men were compacted by thinking of a power outside the world. The sun had conquered, yet it was the end of his spiritual dominion. Dawn, midday, twilight, the zodiacal path, touched neither men's lives nor their hearts, and science retreated into the ground, to concentrate herself upon problems that she was certain of solving.

So when Vashti found her cabin invaded by a rosy finger of light, she was annoyed, and tried to adjust the blind. But the blind flew up altogether, and she saw through the skylight small pink clouds, swaying against a background of blue, and as the sun crept higher, its radiance entered direct, brimming down the wall, like a golden sea. It rose and fell with the air-ship's motion, just as waves rise and fall, but it advanced steadily, as a tide advances. Unless she was careful, it would strike her face. A spasm of horror shook her and she rang for the attendant. The attendant too was horrified, but she could do nothing; it was not her place to mend the blind. She could only suggest that the lady should change her cabin, which she accordingly prepared to do.

People were almost exactly alike all over the world, but the attendant of the air-ship, perhaps owing to her exceptional duties, had grown a little out of the common. She had often to address passengers with direct speech, and this had given her a certain roughness and originality of manner. When Vashti swerved away from the sunbeams with a cry, she behaved barbarically — she put out her hand to steady her.

"How dare you!" exclaimed the passenger. "You forget yourself!"

The woman was confused, and apologised for not having let her fall. People never touched one another. The custom had become obsolete, owing to the Machine.

"Where are we now?" asked Vashti haughtily.

"We are over Asia," said the attendant, anxious to be polite.

"Asia?"

"You must excuse my common way of speaking. I have got into the habit of calling places over which I pass by their unmechanical names."

"Oh, I remember Asia. The Mongols came from it."

"Beneath us, in the open air,

stood a city that was once called Simla."

"Have you ever heard of the Mongols and of the Brisbane school?"

"No."

"Brisbane also stood in the open air."

"Those mountains to the right — let me show you them."

She pushed back a metal blind. The main chain of the Himalayas was revealed. "They were once called the Roof of the World, those mountains."

"What a foolish name!"

"You must remember that, before the dawn of civilisation, they seemed to be an impenetrable wall that touched the stars. It was supposed that no one but the gods could exist above their summits. How we have advanced, thanks to the Machine!"

"How we have advanced, thanks to the Machine!" echoed the passenger who had dropped his Book the night before, and who was standing in the passage.

"And that white stuff in the cracks? — what is it?"

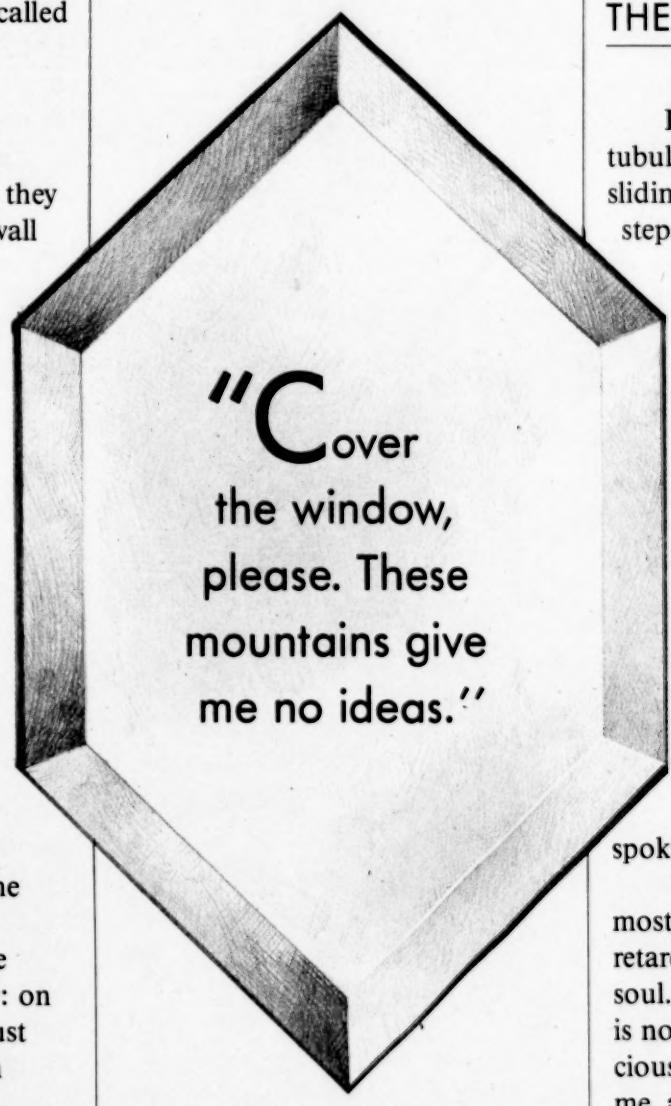
"I have forgotten its name."

"Cover the window, please. These mountains give me no ideas."

The northern aspect of the Himalayas was in deep shadow: on the Indian slope the sun had just prevailed. The forests had been destroyed during the literature epoch for the purpose of making newspaper-pulp, but the snows were awakening to their morning glory, and clouds still hung on the breasts of Kinchinjunga. In the plain were seen the ruins of cities, with diminished rivers creeping by their walls, and by the sides of these were sometimes the signs of vomitories, marking the cities of today. Over the whole prospect air-ships rushed, crossing and intercrossing with incredible *aplomb*, and rising nonchalantly when they desired to escape the perturbations of the lower atmosphere and to traverse the Roof of the World.

"We have indeed advanced, thanks to the Machine," repeated the attendant, and hid the Himalayas behind a metal blind.

The day dragged wearily forward. The passengers sat each in his cabin, avoiding one another with almost physical repulsion and longing to be once more under the surface of the earth. There were eight or ten of them, mostly young males, sent



out from the public nurseries to inhabit the rooms of those who had died in various parts of the earth. The man who had dropped his Book was on the homeward journey. He had been sent to Sumatra for the purpose of propagating the race. Vashti alone was travelling by her private will.

At midday she took a second glance at the earth. The air-ship was crossing another range of mountains, but she could see little, owing to clouds. Masses of black rock hovered below her, and merged indistinctly into grey. Their shapes were fantastic; one of them resembled a prostrate man.

"No ideas here," murmured Vashti, and hid the Caucasus behind a metal blind.

In the evening she looked again. They were crossing a golden sea, in which lay many small islands and one peninsula.

She repeated, "No ideas here," and hid Greece behind a metal blind.

THE MENDING APPARATUS

By a vestibule, by a lift, by a tubular railway, by a platform, by a sliding door — by reversing all the steps of her departure did Vashti arrive at her son's room, which exactly resembled her own. She might well declare that the visit was superfluous. The buttons, the knobs, reading-desk with the Book, the temperature, the atmosphere, the illumination — all were exactly the same. And if Kuno himself, flesh of her flesh, stood close beside her at last, what profit was there in that? She was too well-bred to shake him by the hand.

Averting her eyes, she spoke as follows:

"Here I am. I have had the most terrible journey and greatly retarded the development of my soul. It is not worth it, Kuno, it is not worth it. My time is too precious. The sunlight almost touched me, and I have met with the rudest people. I can only stop a few minutes, and then I must return."

"I have been threatened with Homelessness," said Kuno.

She looked at him now.

"I have been threatened with Homelessness, and I could not tell you such a thing through the Machine."

Homelessness means death. The victim is exposed to the air, which kills him.

"I have been outside since I spoke to you last. The tremendous thing has happened, and they have discovered me."

"But why shouldn't you go outside!" she exclaimed. "It is perfectly

legal, perfectly mechanical, to visit the surface of the earth. I have lately been to a lecture on the sea; there is no objection to that; one simply summons a respirator and gets an Egression-permit. It is not the kind of thing that spiritually-minded people do, and I begged you not to do it, but there is no legal objection to it."

"I did not get an Egression-permit."

"Then how did you get out?"

"I found a way of my own."

The phrase conveyed no meaning to her, and he had to repeat it.

"A way of your own?" she whispered. "But that would be wrong."

"Why?"

The question shocked her beyond measure.

"You are beginning to worship the Machine," he said coldly. "You think it irreligious of me to have found out a way of my own. It was just what the Committee thought, when they threatened me with Homelessness."

At this she grew angry. "I worship nothing!" she cried. "I am most advanced. I don't think you irreligious, for there is no such thing as religion left. All the fear and superstition that existed once have been destroyed by the Machine. I only meant that to find out a way of your own was — Besides, there is no new way out."

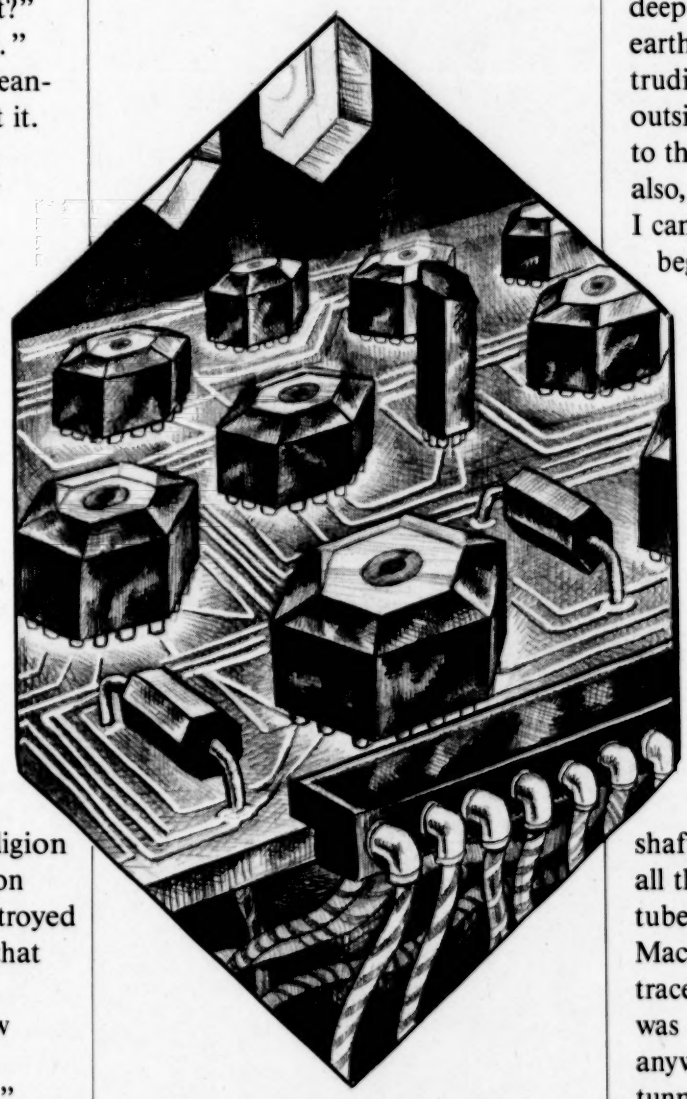
"So it is always supposed."

"Except through the vomitories, for which one must have an Egression-permit, it is impossible to get out. The Book says so."

"Well, the Book's wrong, for I have been out on my feet."

For Kuno was possessed of a certain physical strength.

By these days it was a demerit to be muscular. Each infant was examined at birth, and all who promised undue strength were destroyed. Humanitarians may protest, but it would have been no true kindness to let an athlete live; he would never have been happy in that state of life to which the Machine had called him; he would have yearned for trees to climb, rivers to bathe in, meadows and hills against which he might measure his body. Man must be adapted to his surroundings, must he not? In the dawn of the world, our weakly must be exposed on Mount Taygetus, in its twilight our strong will suffer euthanasia, that the Machine may progress, that the Machine may progress, that the Machine may progress eternally.



"You know that we have lost the sense of space. We say 'space is annihilated,' but we have annihilated not space, but the sense thereof. We have lost a part of ourselves. I determined to recover it, and I began by walking up and down the platform of the railway outside my room. Up and down, until I was tired, and so did recapture the meaning of 'Near' and 'Far.' 'Near' is a place to which I can get quickly *on my feet*, not a place to which the train or the air-ship will take me quickly. 'Far' is a place to which I cannot get quickly on my feet; the vomitory is 'far,' though I could be there in thirty-eight seconds by summoning the train. Man is the measure. That was my first lesson. Man's feet are the measure for distance, his hands are the measure for ownership, his body is the measure for all that is lovable and desirable and strong. Then I went further: it was then that I called to you for the first time, and you would not come.

"This city, as you know, is built deep beneath the surface of the earth, with only the vomitories protruding. Having paced the platform outside my own room, I took the lift to the next platform and paced that also, and so with each in turn, until I came to the topmost, above which begins the earth. All the platforms were exactly alike, and all that I gained by visiting them was to develop my sense of space and my muscles. I think I should have been content with this — it is not a little thing — but as I walked and brooded, it occurred to me that our cities had been built in the days when men still breathed the outer air, and that there had been ventilation shafts for the workmen. I could think of nothing but these ventilation shafts. Had they been destroyed by all the food-tubes and medicine-tubes and music-tubes that the Machine has evolved lately? Or did traces of them remain? One thing was certain. If I came upon them anywhere, it would be in the railway-tunnels of the topmost story. Everywhere else, all space was accounted for.

"I am telling my story quickly, but don't think that I was not a coward or that your answers never depressed me. It is not the proper thing, it is not mechanical, it is not decent to walk along a railway-tunnel. I did not fear that I might tread upon a live rail and be killed. I feared something far more intangible — doing what was not contemplated by the Machine. Then I said to myself, 'Man is the measure,' and I went, and after many visits I found an opening.

"The tunnels, of course, were lighted. Everything is light, artificial

light; darkness is the exception. So when I saw a black gap in the tiles, I knew that it was an exception, and rejoiced. I put in my arm — I could put in no more at first — and waved it round and round in ecstasy. I loosened another tile, and put in my head, and shouted into the darkness: 'I am coming, I shall do it yet,' and my voice reverberated down endless passages. I seemed to hear the spirits of those dead workmen who had returned each evening to the starlight and to their wives, and all the generations who had lived in the open air called back to me, 'You will do it yet, you are coming.'"

He paused, and, absurd as he was, his last words moved her. For Kuno had lately asked to be a father, and his request had been refused by the Committee. His was not a type that the Machine desired to hand on.

"Then a train passed. It brushed by me, but I thrust my head and arms into the hole. I had done enough for one day, so I crawled back to the platform, went down in the lift, and summoned my bed. Ah, what dreams! And again I called you, and again you refused."

She shook her head and said:

"Don't. Don't talk of these terrible things. You make me miserable. You are throwing civilisation away."

"But I had got back the sense of space and a man cannot rest then. I determined to get in at the hole and climb the shaft. And so I exercised my arms. Day after day I went through ridiculous movements, until my flesh ached, and I could hang by my hands and hold the pillow of my bed outstretched for many minutes. Then I summoned a respirator and started.

"It was easy at first. The mortar had somehow rotted, and I soon pushed some more tiles into the darkness, and the spirits of the dead comforted me. I don't know what I mean by that. I just say what I felt. I felt, for the first time, that a protest had been lodged against corruption, and that even as the dead were comforting me, so I was comforting the unborn. I felt that humanity existed, and that it existed without clothes. How can I possibly explain this? It was naked, humanity seemed naked, and all these tubes and buttons and machineries neither came into the world with us, nor will they follow us out, nor do they matter supremely while we are here. Had I been strong, I would have torn off every garment I had, and gone out into the outer air unswaddled. But this is not for me, nor perhaps for my generation. I climbed with my respirator and my hygienic clothes and my dietetic tabloids! Better thus than not at all.

Kuno had lately asked to be a father, and his request had been refused by the Committee. His was not a type that the Machine desired to hand on.

"There was a ladder, made of some primeval metal. The light from the railway fell upon its lowest rungs, and I saw that it led straight upwards out of the rubble at the bottom of the shaft. Perhaps our ancestors ran up and down it a dozen times daily, in their building. As I climbed, the rough edges cut through my gloves so that my hands bled. The light helped me for a little, and then came darkness and, worse still, silence which pierced my ears like a sword. The Machine hums! Did you know that? Its hum penetrates our blood, and may even guide our thoughts. Who knows! I was getting beyond its power. Then I thought: 'This silence means that I am doing wrong.' But I heard voices in the silence, and again they strengthened me." He laughed. "I had need of them. The next moment I cracked my head against something."

She sighed.

"I had reached one of those pneumatic stoppers that defend us from the outer air. You may have noticed them on the air-ship. Pitch dark, my feet on the rungs of an invisible ladder, my hands cut; I cannot explain how I lived through this part, but the voices still comforted me, and I felt for fastenings. The stopper, I suppose, was about eight feet across. I passed my hand over it as far as I could reach. It was perfectly smooth. I felt it almost to the centre. Not quite to the centre, for my arm was too short. Then the voice said: 'Jump. It is worth it. There may be a handle in the centre, and you may catch hold of it and so come to us your own way. And if there is no handle, so that you may fall and are dashed to pieces — it is still worth it: you will still come to us your own way.' So I jumped. There was a handle, and —"

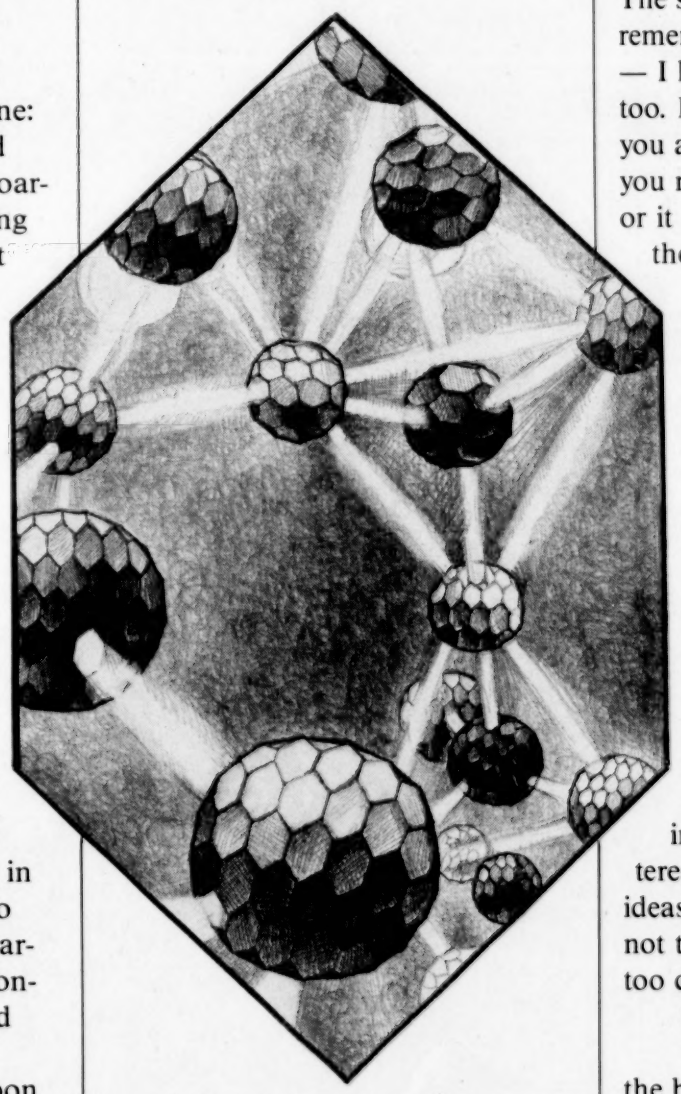
He paused. Tears gathered in his mother's eyes. She knew that he was fated. If he did not die today he would die tomorrow. There was not room for such a person in the world. And with her pity disgust mingled. She was ashamed at having borne such a son, she who had always been so respectable and so full of ideas. Was he really the little boy to whom she had taught the use of his stops and buttons, and to whom she had given his first lessons in the Book? The very hair that disfigured his lip showed that

he was reverting to some savage type. On atavism the Machine can have no mercy.

"There was a handle, and I did catch it. I hung tranced over the darkness and heard the hum of these workings as the last whisper in a dying dream. All the things I had cared about and all the people I had spoken to through tubes appeared infinitely little. Meanwhile the handle revolved. My weight had set something in motion and I span slowly, and then —

"I cannot describe it. I was lying with my face to the sunshine: Blood poured from my nose and ears and I heard a tremendous roaring. The stopper, with me clinging to it, had simply been blown out of the earth, and the air that we make down here was escaping through the vent into the air above. It burst up like a fountain. I crawled back to it — for the upper air hurts — and, as it were, I took great sips from the edge. My respirator had flown goodness knows where, my clothes were torn. I just lay with my lips close to the hole, and I sipped until the bleeding stopped. You can imagine nothing so curious. This hollow in the grass — I will speak of it in a minute, — the sun shining into it, not brilliantly but through marbled clouds, — the peace, the nonchalance, the sense of space, and brushing my cheek, the roaring fountain of our artificial air! Soon I spied my respirator, bobbing up and down in the current high above my head, and higher still were many air-ships. But no one ever looks out of air-ships, and in my case they could not have picked me up. There I was, stranded. The sun shone a little way down the shaft, and revealed the topmost rung of the ladder, but it was hopeless trying to reach it. I should either have been tossed up again by the escape, or else have fallen in, and died. I could only lie on the grass, sipping and sipping, and from time to time glancing around me.

"I knew that I was in Wessex, for I had taken care to go to a lecture on the subject before starting. Wessex lies above the room in which we are talking now. It was once an important state. Its kings held all the southern coast from the Andredswald to Cornwall, while the Wansdyke protected them on the north, running over the high ground. The lecturer was only concerned with the rise of Wessex, so



I do not how how long it remained an international power, nor would the knowledge have assisted me. To tell the truth I could do nothing but laugh, during this part. There was I, with a pneumatic stopper by my side and a respirator bobbing over my head, imprisoned, all three of us, in a grass-grown hollow that was edged with fern."

Then he grew grave again.

"Lucky for me that it was a hollow. For the air began to fall back into it and to fill it as water fills a bowl. I could crawl about. Presently I stood. I breathed a mixture, in which the air that hurts predominated whenever I tried to climb the sides. This was not so bad. I had not lost my tabloids and remained ridiculously cheerful, and as for the Machine, I forgot about it altogether. My one aim now was to get to the top, where the ferns were, and to view whatever objects lay beyond.

"I rushed the slope. The new air was still too bitter for me and I came rolling back, after a momentary vision of something grey. The sun grew very feeble, and I remembered that he was in Scorpio — I had been to a lecture on that too. If the sun is in Scorpio and you are in Wessex, it means that you must be as quick as you can, or it will get too dark. (This is the first bit of useful information I have ever got from a lecture, and I expect it will be the last.) It made me try frantically to breathe the new air, and to advance as far as I dared out of my pond. The hollow filled so slowly. At times I thought that the fountain played with less vigour. My respirator seemed to dance nearer the earth; the roar was decreasing."

He broke off.

"I don't think this is interesting you. The rest will interest you even less. There are no ideas in it, and I wish that I had not troubled you to come. We are too different, mother."

She told him to continue.

"It was evening before I climbed the bank. The sun had very nearly slipped out of the sky by this time, and I could not get a good view. You, who have just crossed the Roof of the World, will not want to hear an account of the little hills that I saw — low colourless hills. But to me they were living and the turf that covered them was a skin, under which their muscles rippled, and I felt that those hills had called with incalculable force to men in the past, and that men had loved them. Now they sleep — perhaps for ever. They commune with humanity in dreams. Happy the man, happy the woman, who awakes the hills of Wessex. For though they sleep, they will

never die."

His voice rose passionately.

"Cannot you see, cannot all your lectures see, that it is we who are dying, and that down here the only thing that really lives is the Machine? We created the Machine, to do our will, but we cannot make it do our will now. It has robbed us of the sense of space and of the sense of touch, it has blurred every human relation and narrowed down love to a carnal act, it has paralysed our bodies and our wills, and now it compels us to worship it. The Machine develops — but not on our lines. The Machine proceeds — but not to our goal. We only exist as the blood corpuscles that course through its arteries, and if it could work without us, it would let us die. Oh, I have no remedy — or, at least, only one — to tell men again and again that I have seen the hills of Wessex as Aelfrid saw them when he overthrew the Danes.

"So the sun set. I forgot to mention that a belt of mist lay between my hill and other hills, and that it was the colour of pearl."

He broke off for the second time.

"Go on," said his mother wearily.

He shook his head.

"Go on. Nothing that you say can distress me now. I am hardened."

"I had meant to tell you the rest but I cannot: I know that I cannot: good-bye."

Vashti stood irresolute. All her nerves were tingling with his blasphemies. But she was also inquisitive.

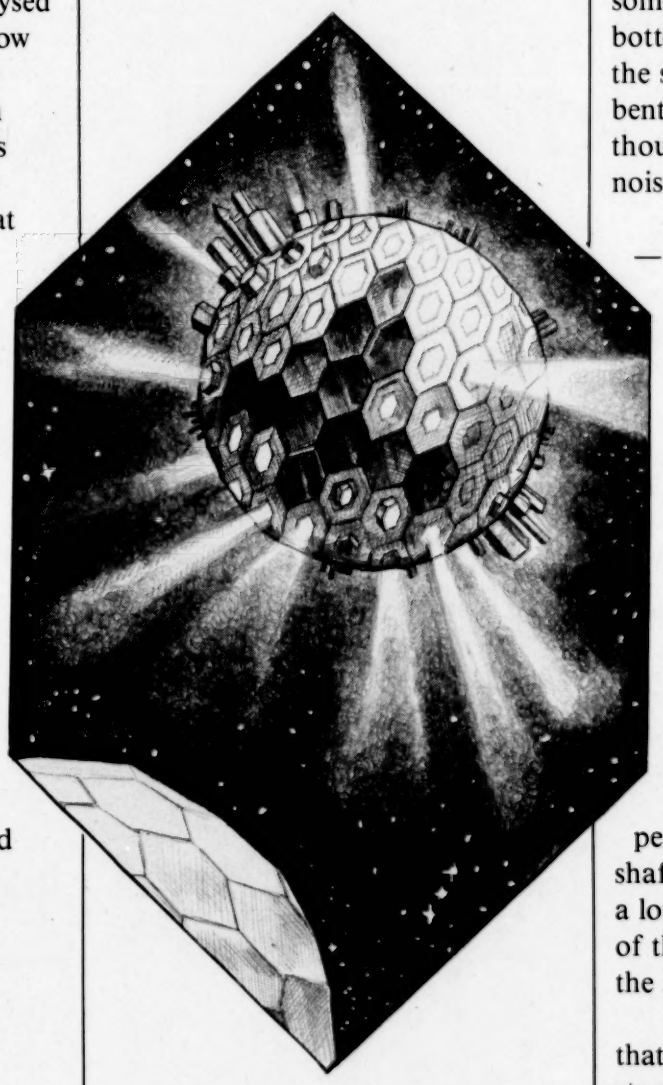
"This is unfair," she complained. "You have called me across the world to hear your story, and hear it I will. Tell me — as briefly as possible, for this is a disastrous waste of time — tell me how you returned to civilisation."

"Oh — that!" he said, starting. "You would like to hear about civilisation. Certainly. Had I got to where my respirator fell down?"

"No — but I understand everything now. You put on your respirator, and managed to walk along the surface of the earth to a vomitory, and there your conduct was reported to the Central Committee."

"By no means."

He passed his hand over his forehead, as if dispelling some strong impression. Then, resuming his narrative, he warmed to it again.



"My respirator fell about sunset. I had mentioned that the fountain seemed feebler, had I not."

"Yes."

"About sunset, it let the respirator fall. As I said, I had entirely forgotten about the Machine, and I paid no great attention at the time, being occupied with other things. I had my pool of air, into which I could dip when the outer keenness became intolerable, and which would possibly remain for days, provided that no wind sprang up to disperse it. Not until it was too late, did I realize what the stoppage of the escape implied. You see — the gap in the tunnel had been mended; the Mending Apparatus; the Mending Apparatus, was after me.

"One other warning I had, but I neglected it. The sky at night was clearer than it had been in the day, and the moon, which was about half the sky behind the sun, shone into the dell at moments quite brightly. I was in my usual place — on the boundary between the two atmospheres — when I thought I saw something dark move across the bottom of the dell, and vanish into the shaft. In my folly, I ran down. I bent over and listened, and I thought I heard a faint scraping noise in the depths.

"At this — but it was too late — I took alarm. I determined to put on my respirator and to walk right out of the dell. But my respirator had gone. I knew exactly where it had fallen — between the stopper and the aperture — and I could even feel the mark that it had made in the turf. It had gone, and I realized that something evil was at work, and I had better escape to the other air, and, if I must die, die running towards the cloud that had been the colour of a pearl. I never started. Out of the shaft — it is too horrible. A worm, a long white worm, had crawled out of the shaft and was gliding over the moonlit grass.

"I screamed. I did everything that I should not have done, I stamped upon the creature instead of flying from it, and it at once curled round the ankle. Then we fought. The worm let me run all over the dell, but edged up my leg as I ran. 'Help!' I cried. (That part is too awful. It belongs to the part that you will never know.) 'Help!' I cried. (Why cannot we suffer in silence?) 'Help!' I cried. Then my feet were wound together, I fell, I was dragged away from the dear ferns and the living hills, and past the great metal stopper (I can tell you this part), and I thought it might save me again if I caught hold of the handle. It also was enwrapped, it also. Oh, the whole dell was full of the

things. They were searching in all directions, they were denuding it, and the white snouts of others peeped out of the hole, ready if needed. Everything that could be moved they brought — brushwood, bundles of fern, everything, and down we all went intertwined into hell. The last things that I saw, ere the stopper closed after us, were certain stars, and I felt that a man of my sort lived in the sky. For I did fight, I fought till the very end, and it was only my head hitting against the ladder that quieted me.

"I woke up in this room. The worms had vanished. I was surrounded by artificial air, artificial light, artificial peace, and my friends were calling to me down speaking-tubes to know whether I had come across any new ideas lately."

Here his story ended. Discussion of it was impossible, and Vashti turned to go.

"It will end in Homelessness," she said quietly.

"I wish it would," retorted Kuno.

"The Machine has been most merciful."

"I prefer the mercy of God."

"By that superstitious phrase, do you mean that you could live in the outer air?"

"Yes."

"Have you ever seen, round the vomitories, the bones of those who were extruded after the Great Rebellion?"

"Yes."

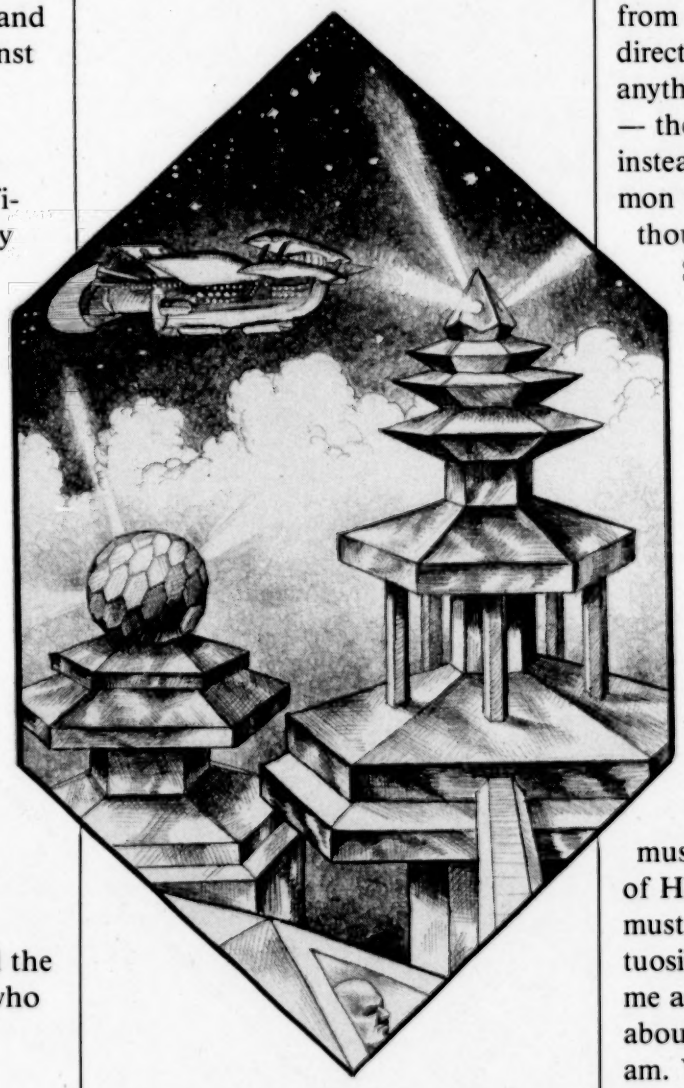
"They were left where they perished for our edification. A few crawled away, but they perished, too — who can doubt it? And so with the Homeless of our own day. The surface of the earth supports life no longer."

THE HOMELESS

During the years that followed Kuno's escapade, two important developments took place in the Machine. On the surface they were revolutionary, but in either case men's minds had been prepared beforehand, and they did but express tendencies that were latent already.

The first of these was the abolition of respirators.

Advanced thinkers, like Vashti, had always held it foolish to visit the surface of the earth. Air-ships might be necessary, but what was the good of going out for mere curiosity and crawling along for a mile or two in



a terrestrial motor? The habit was vulgar and perhaps faintly improper: it was unproductive of ideas, and had no connection with the habits that really mattered. So respirators were abolished, and with them, of course, the terrestrial motors, and except for a few lecturers, who complained that they were debarred access to their subject-matter, the development was accepted quietly. Those who still wanted to know what the earth was like had after all only to look into some cinematophote. And even the lecturers acquiesced when they found that a lecture on the sea was none the less stimulating when compiled out of other lectures that had already been delivered on the same subject. "Beware of first-hand ideas!" exclaimed one of the most advanced of them. "First-hand ideas do not really exist. They are but the physical impressions produced by love and fear, and on this gross foundation who could erect a philosophy? Let your ideas be second-hand, and if possible tenth-hand, for then they will be far removed from that disturbing element — direct observation. Do not learn anything about this subject of mine — the French Revolution. Learn instead what I think that Enicharmon thought Urizen thought Gutch thought Ho-Yung thought Chi-Bo-Sing thought Lafcadio Hearn thought Carlyle thought Mirabeau said about the French Revolution. Through the medium of these eight great minds, the blood that was shed at Paris and the windows that were broken at Versailles will be clarified to an idea which you may employ most profitably in your daily lives. But be sure that the intermediates are many and varied, for in history one authority exists to counteract another. Urizen must counteract the scepticism of Ho-Yung and Enicharmon, I must myself counteract the impetuosity of Gutch. You who listen to me are in a better position to judge about the French Revolution than I am. Your descendants will be even in a better position than you, for they will learn what you think I think, and yet another intermediate will be added to the chain. And in time" — his voice rose — "there will come a generation that has got beyond facts, beyond impressions, a generation absolutely colourless,

'seraphically free
From taint of personality,'

which will see the French Revolution not as it happened, nor as they would like it to have happened, but as it would have happened, had it taken place in the days of the Machine."

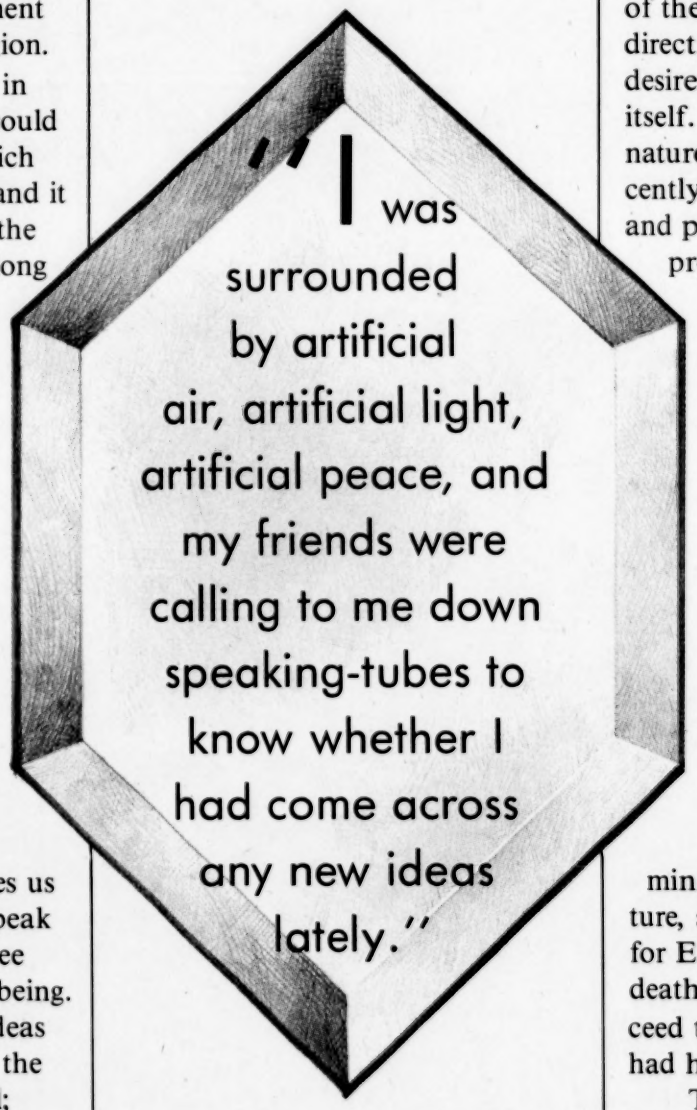
Tremendous applause greeted

this lecture, which did but voice a feeling already latent in the minds of men — a feeling that terrestrial facts must be ignored, and that the abolition of respirators was a positive gain. It was even suggested that air-ships should be abolished too. This was not done, because air-ships had somehow worked themselves into the Machine's system. But year by year they were used less, and mentioned less by thoughtful men.

The second great development was the reestablishment of religion.

This, too, had been voiced in the celebrated lecture. No one could mistake the reverent tone in which the peroration had concluded, and it awakened a responsive echo in the heart of each. Those who had long worshipped silently, now began to talk. They described the strange feeling of peace that came over them when they handled the Book of the Machine, the pleasure that it was to repeat certain numerals out of it, however little meaning those numerals conveyed to the outward ear, the ecstasy of touching a button, however unimportant, or of ringing an electric bell, however superfluously.

"The Machine," they exclaimed, "feeds us and clothes us and houses us; through it we speak to one another, through it we see one another, in it we have our being. The Machine is the friend of ideas and the enemy of superstition: the Machine is omnipotent, eternal; blessed is the Machine." And before long this allocution was printed on the first page of the Book, and in subsequent editions the ritual swelled into a complicated system of praise and prayer. The word "religion" was sedulously avoided, and in theory the Machine was still the creation and the implement of man. But in practice, all, save a few retrogrades, worshipped it as divine. Nor was it worshipped in unity. One believer would be chiefly impressed by the blue optic plates, through which he saw other believers; another by the mending apparatus, which sinful Kuno had compared to worms; another by the lifts, another by the Book. And each would pray to this or to that, and ask it to intercede for him with the Machine as a whole. Persecution — that also was present. It did not break out, for reasons that will be set forward shortly. But it was latent, and all who did not accept the minimum known as "undenominational Mechanism" lived in danger of Homelessness, which means death, as we know.


"I was surrounded by artificial air, artificial light, artificial peace, and my friends were calling to me down speaking-tubes to know whether I had come across any new ideas lately."

To attribute these two great developments to the Central Committee, is to take a very narrow view of civilisation. The Central Committee announced the developments, it is true, but they were no more the cause of them than were the kings of the imperialistic period the cause of war. Rather did they yield to some invincible pressure, which came no one knew whither, and which, when gratified, was succeeded by some new pressure equally invincible. To such a state of affairs it is convenient to give the name of progress. No one confessed the Machine was out of hand. Year by year it was served with increased efficiency and decreased intelligence. The better a man knew his own duties upon it, the less he understood the duties of his neighbor, and in all the work there was not one who understood the monster as a whole. Those master brains had perished. They had left full directions, it is true, and their successors had each of them mastered a portion of those directions. But Humanity, in its desire for comfort, had over-reached itself. It had exploited the riches of nature too far. Quietly and complacently, it was sinking into decadence, and progress had come to mean the progress of the Machine.

As for Vashti, her life went peacefully forward until the final disaster. She made her room dark and slept; she awoke and made the room light. She lectured and attended lectures. She exchanged ideas with her innumerable friends and believed she was growing more spiritual. At times a friend was granted Euthanasia, and left his or her room for the homelessness that is beyond all human conception. Vashti did not much mind. After an unsuccessful lecture, she would sometimes ask for Euthanasia herself. But the death-rate was not permitted to exceed the birth-rate, and the Machine had hitherto refused it to her.

The troubles began quietly, long before she was conscious of them.

One day she was astonished at receiving a message from her son. They never communicated, having nothing in common, and she had only heard indirectly that he was still alive, and had been transferred from the northern hemisphere, where he had behaved so mischievously, to the southern — indeed, to a room not far from her own.

"Does he want me to visit him?" she thought. "Never again, never. And I have not the time."

No, it was madness of another kind.

He refused to visualize his face upon the blue plate, and speaking out of the darkness with solemnity said:

"The Machine stops."

"What do you say?"

"The Machine is stopping. I know it, I know the signs."

She burst into a peal of laughter. He heard her and was angry, and they spoke no more.

"Can you imagine anything more absurd?" she cried to a friend. "A man who was my son believes that the Machine is stopping. It would be impious if it was not mad."

"The Machine is stopping?" her friend replied. "What does that mean? The phrase conveys nothing to me."

"Nor to me."

"He does not refer, I suppose, to the trouble there has been lately with the music?"

"Oh no, of course not. Let us talk about music."

"Have you complained to the authorities?"

"Yes, and they say it wants mending, and referred me to the Committee of the Mending Apparatus. I complained of those curious gasping sighs that disfigure the symphonies of the Brisbane school. They sound like some one in pain. The Committee of the Mending Apparatus say that it shall be remedied shortly."

Obscurely worried, she resumed her life. For one thing, the defect in the music irritated her. For another thing, she could not forget Kuno's speech. If he had known that the music was out of repair — he could not know it, for he detested music — if he had known that it was wrong, "the Machine stops" was exactly the venomous sort of remark he would have made. Of course he had made it at a venture, but the coincidence annoyed her, and she spoke with some petulance to the Committee of the Mending Apparatus.

They replied, as before, that the defect would be set right shortly.

"Shortly! At once!" she retorted. "Why should I be worried by imperfect music? Things are always put right at once. If you do not mend it at once, I shall complain to the Central Committee."

"No personal complaints are received by the Central Committee," the Committee of the mending Apparatus replied.

"Through whom am I to make my complaint, then?"

"Through us."

"I complain, then."

"Your complaint shall be forwarded in its turn."

"Have others complained?"

This question was unmechanical, and the Committee of the Mending Appartus refused to answer it.

"It is too bad!" she exclaimed to another of her friends. "There never was such an unfortunate woman as myself. I can never be sure of my music now. It gets worse and worse each time I summon it."

"I too have my troubles," the friend replied. "Sometimes my ideas are interrupted by a slight jarring noise."

"What is it?"

"I do not know whether it is inside my head, or inside the wall."

"Complain, in either case."

"I have complained, and my complaint will be forwarded in its turn to the Central Committee."

Time passed, and they resented the defects no longer. The defects had not been remedied, but the human tissues in that latter day had become so subservient, that they readily adapted themselves to every caprice of the Machine. The sigh at the crisis of the Brisbane symphony no longer irritated Vashti; she accepted it as part of the melody. The jarring noise, whether in the head or in the wall, was no longer resented by her friend. And so with the mouldy artificial fruit, so with the bath water that began to stink, so with the defective rhymes that the poetry machine had taken to emit. All were bitterly complained of at first, and then acquiesced in and forgotten. Things went from bad to worse unchallenged.

It was otherwise with the failure of the sleeping apparatus. That was a more serious stoppage. There came a day when the whole world — in Sumatra, in Wessex, in the innumerable cities of Courland and Brazil — the beds, when summoned by their tired owners, failed to appear. It may seem a ludicrous matter, but from it we may date the collapse of humanity. The Committee responsible for the failure was assailed by complainants, whom it referred, as usual, to the Committee of the Mending Apparatus, who in its turn assured them that their complaints would be forwarded to the Central Committee. But the discontent grew, for mankind was not yet sufficiently adaptable to do without sleeping.

"Some one is meddling with the Machine — " they began.

"Some one is trying to make himself king, to reintroduce the personal element."

"Punish that man with Homelessness."

"To the rescue! Avenge the Machine! Avenge the Machine!"

"War! Kill the man!"

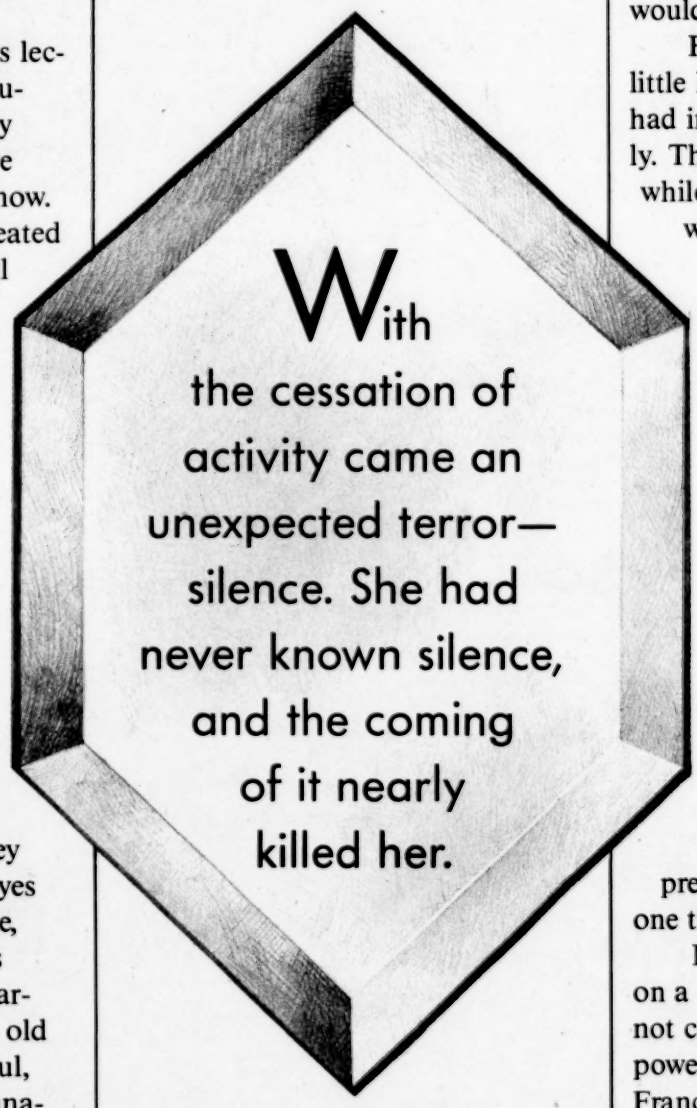
But the Committee of the Mending Apparatus now came forward, and allayed the panic with well-chosen words. It confessed that the Mending Apparatus was itself in need of repair.

The effect of this frank confession was admirable.

"Of course," said a famous lecturer — he of the French Revolution, who gilded each new decay with splendour — "of course we shall not press our complaints now. The Mending Apparatus has treated us so well in the past that we all sympathize with it, and will wait patiently for its recovery. In its own good time it will resume its duties. Meanwhile let us do without our beds, our tabloids, our other little wants. Such, I feel sure, would be the wish of the Machine."

Thousands of miles away his audience applauded. The Machine still linked them. Under the seas, beneath the roots of the mountains, ran the wires through which they saw and heard, the enormous eyes and ears that were their heritage, and the hum of many workings clothed their thoughts in one garment of subserviency. Only the old and the sick remained ungrateful, for it was rumoured that Euthanasia, too, was out of order, and that pain had reappeared among men.

It became difficult to read. A blight entered the atmosphere and dulled its luminosity. At times Vashti could scarcely see across her room. The air, too, was foul. Loud were the complaints, impotent the remedies, heroic the tone of the lecturer as he cried: "Courage, courage! What matter so long as the Machine goes on? To it the darkness and the light are one." And though things improved again after a time, the old brilliancy was never recaptured, and humanity never recovered from its entrance into twilight. There was an hysterical talk of "measures," of "provisional dictatorship," and the inhabitants of Sumatra were asked to familiarize themselves with the workings of the central power station, the said power station being situated in France. But for the most part panic reigned, and men spent their strength praying to their Books, tangible proofs of the Machine's omnipotence. There were


With the cessation of activity came an unexpected terror— silence. She had never known silence, and the coming of it nearly killed her.

gradations of terror — at times came rumours of hope — the Mending Apparatus was almost mended — the enemies of the Machine had been got under — new "nerve-centres" were evolving which would do the work even more magnificently than before. But there came a day when, without the slightest warning, without any previous hint of feebleness, the entire communication-system broke down, all over the world, and the world as they understood it, ended.

Vashti was lecturing at the time and her earlier remarks had been punctuated with applause. As she proceeded the audience became silent, and at the conclusion there was no sound. Somewhat displeased, she called to a friend who was a specialist in sympathy. No sound: doubtless the friend was sleeping. And so with the next friend whom she tried to summon, and so with the next, until she remembered Kuno's cryptic remark, "The Machine stops."

The phrase still conveyed nothing. If Eternity was stopping it would of course be set going shortly.

For example, there was still a little light and air — the atmosphere had improved a few hours previously. There was still the Book, and while there was the Book there was security.

Then she broke down, for with the cessation of activity came an unexpected terror — silence.

She had never known silence, and the coming of it nearly killed her — it did kill many thousands of people outright. Ever since her birth she had been surrounded by a steady hum. It was to the ear what artificial air was to the lungs, and agonizing pains shot across her head. And scarcely knowing what she did, she stumbled forward and pressed the unfamiliar button, the one that opened the door of her cell.

Now the door of the cell worked on a simple hinge of its own. It was not connected with the central power station, dying far away in France. It opened, rousing immoderate hope in Vashti, for she thought that the Machine had been mended. It opened, and she saw the dim tunnel that curved far away towards freedom. One look and then she shrank back. For the tunnel was full of people — she was almost the last in that city to have taken alarm.

People at any rate repelled her, and these were nightmares from her worst dreams. People were crawling about, people were screaming, whimpering, gasping for breath, touching each other, vanishing in the dark, and ever and anon being pushed off the platform onto the live rail. Some were fighting round the electric bells, trying to summon

trains which could not be summoned. Other were yelling for Euthanasia or for respirators, or blaspheming the Machine. Others stood at the doors of their cells fearing, like herself, either to stop in them or to leave them. And behind all the uproar was silence — the silence which is the voice of the earth and of the generations who have gone.

No — it was worse than solitude. She closed the door again and sat down to wait for the end. The disintegration went on, accompanied by horrible cracks and rumbling. The valves that restrained the Medical Apparatus must have been weakened, for it ruptured and hung hideously from the ceiling. The floor heaved and flung her from her chair. A tube oozed toward her serpent fashion. And at last the final horror approached — light began to ebb, and she knew that civilisation's long day was closing.

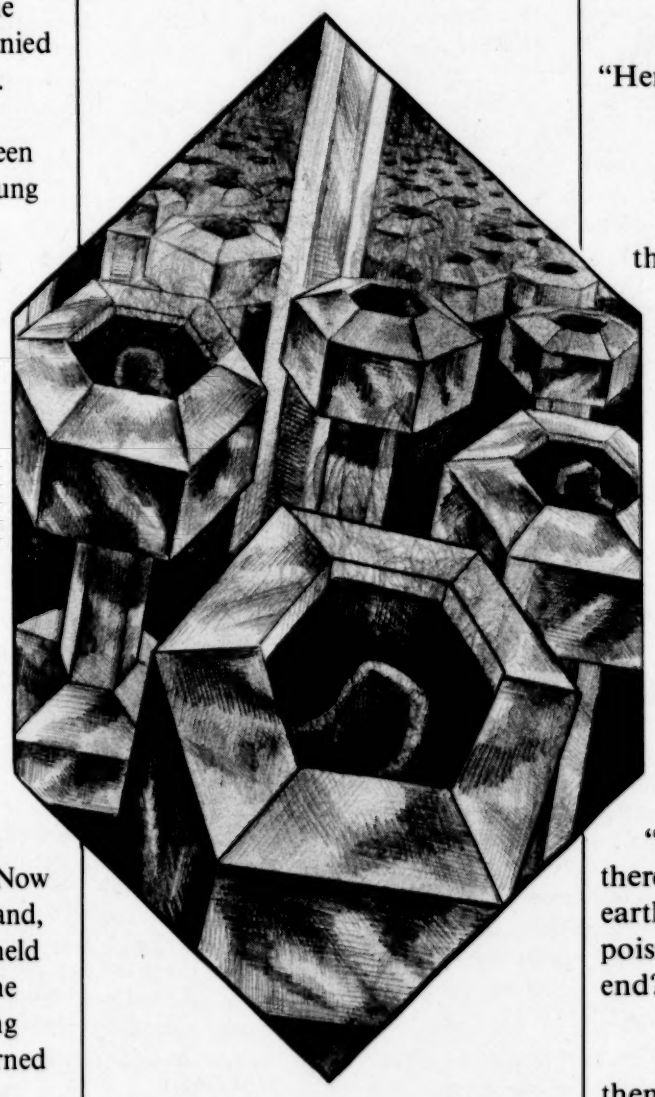
She whirled round, praying to be saved from this, at any rate, kissing the Book, pressing button after button. The uproar outside was increasing, and even penetrated the wall. Slowly the brilliancy of her cell was dimmed, the reflections faded from her metal switches. Now she could not see the reading-stand, now not the Book, though she held it in her hand. Light followed the flight of sound, air was following light, and the original void returned to the cavern from which it had been so long excluded. Vashti continued to whirl, like the devotees of an earlier religion, screaming, praying, striking at the buttons with bleeding hands.

It was thus that she opened her prison and escaped — escaped in the spirit: at least so it seems to me, ere my meditation closes. That she escaped in the body — I cannot perceive that. She struck, by chance, the switch that released the door, and the rush of foul air on her skin, the loud throbbing whispers in her ears, told her that she was facing the tunnel again, and that tremendous platform on which she had seen men fighting. They were not fighting now. Only the whispers remained, and the little whimpering groans. They were dying by hundreds out in the dark.

She burst into tears.

Tears answered her.

They wept for humanity, those two, not for themselves. They could not bear that this should be the end. Ere silence was completed their



hearts were opened, and they knew what had been important on the earth. Man, the flower of all flesh, the noblest of all creatures visible, man who had once made god in his image, and had mirrored his strength on the constellations, beautiful naked man was dying, strangled in the garments he had woven. Century after century had he toiled, and here was his reward. Truly the garment had seemed heavenly at first, shot with the colours of culture, sewn with the threads of self-denial. And heavenly it had been so long as it was a garment and no more, so long as man could shed it at will and live by the essence that is his soul, and the essence, equally divine, that is his body. The sin against the body — it was for that they wept in chief; the centuries of wrong against the muscles and the nerves, and those five portals by which we can alone comprehend — glazing it over with talk of evolution, until the body was white pap, the home of ideas as colourless, last sloshy stirrings of a spirit that had grasped the stars.

"Where are you?" she sobbed.

His voice in the darkness said, "Here."

"Is there any hope, Kuno?"

"None for us."

"Where are you?"

She crawled towards him over the bodies of the dead. His blood spurted over her hands.

"Quicker," he gasped. "I am dying — but we touch, we talk, not through the Machine."

He kissed her.

"We have come back to our own. We die, but we have recaptured life, as it was in Wessex, when Aelfrid overthrew the Danes. We know what they know outside, they who dwelt in the cloud that is the colour of a pearl."

"But, Kuno, is it true? Are there still men on the surface of the earth? Is this — this tunnel, this poisoned darkness — really not the end?"

He replied:

"I have seen them, spoken to them, loved them. They are hiding in the mist and the ferns until our civilisation stops. Today they are the Homeless — tomorrow — "

"Oh, tomorrow — some fool will start the Machine again, tomorrow."

"Never," said Kuno, "never. Humanity has learnt its lesson."

As he spoke the whole city was broken like a honeycomb. An airship had sailed in through the vomitory into a ruined wharf. It crashed downwards, exploding as it went, rending gallery after gallery with its wings of steel. For a moment they saw the nations of the dead, and, before they joined them, scraps of the untainted sky. ■

Gratefulness, the Heart of Prayer

STEWART BRAND: *As a lapsed Protestant, Peyotist, and Buddhist, I am persistently surprised by some abiding, underlying-everything spiritual practice of mine that I can't shake. It's as banal as manners. "Thank you very much." ("Sanctuary much," it sounds like to the ever-vigilant internal punster.) Some early counselor, probably in a book, taught me to thank the campsite when departing, and I've been muttering thanks to everything in our departing world ever since. Feeling foolish the whole while.*

You too?

Brother David, a Benedictine monk, says we're doing the right thing, says it's the main event, and his saying is so intelligent and beguiling that, the first thing you know, a polite habit becomes whole-hearted and original, a window on the constant surprise.

•

The heart is a leisurely muscle. It differs from all other muscles. How many push-ups can you make before the muscles in your arms and stomach get so tired that you have to stop? But your heart muscle goes on working for as long as you live. It does not get tired, because there is a phase of rest built into every single heartbeat. Our physical heart works leisurely. And when we speak of the heart in a wider sense, the idea that life-giving leisure lies at the very center is implied.

•

. . . it is not joy that makes us grateful; it is gratitude that makes us joyful.

Gratefulness, the Heart of Prayer
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Brother David Steindl-Rast
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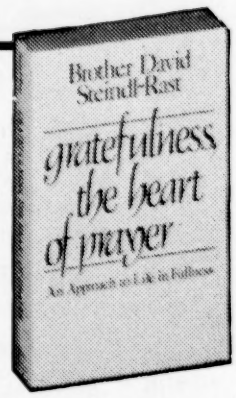

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You

The relationship between I and Thou has been brilliantly explored by Ferdinand Ebner and Martin Buber. But it took them volumes to say what e.e. cummings sings in a single line of a love poem: "I am through You so I." (Not only am I through you so happy, so alive, but "so I.") In moments in which I can sing this line with conviction, I know that fulfillment is found when I am completely empty.

•

The universe may
Be as great as they say.
But it wouldn't be missed
If it didn't exist.

With a disarming smile, this little jingle by Piet Hein lays bare the gratuitousness of absolutely everything. The universe is gratis. It cannot be earned, nor need it be earned. From this simple fact of experience springs grateful living, grace-filled living. Gratefulness is the heart's full response to the gratuitousness of all that exists.

The Classics of Western Spirituality

JAY KINNEY: *I can't praise this series of books too highly. In an ecumenical move transcending that of any other religious publisher I can think of, Paulist Press has committed itself to publish the most important writings of the key figures of western religion. They've made it an ongoing series that will ultimately comprise as many as eighty volumes. These classics include both the famous and the relatively obscure, not only in Christian spirituality, but in Jewish, Islamic, and Native spiritualities as well. The authors' writings are each preceded by a knowledgeable introduction giving some biographical information and placing the texts in the context of the writers' times and other works.*

As might be expected with an encyclopaedic project such as this, each volume is not going to be of equal interest to everyone. What's important is that Origen, Julian of Norwich, Sharafuddin Maneri, Menahem Nahum, and several dozen other mystics and spiritual masters are now easily accessible and accorded equal stature. The books are all attractively designed, nicely printed, and modestly priced, and available individually or by subscription. The series, which is now up to forty volumes, has been going for several years at the pace of approximately one book a month. If your local library isn't already acquiring the series as they appear, I'd suggest they catch up: books such as these are what libraries are for.

•

'Male and female He created them.'
From here we learn:
Any image that does not embrace male and female is not a high and true image.
We have established this in the mystery of our Mishnah.
—Zohar
from ***Zohar, The Book of Enlightenment***

•

And in this he showed me something small, no bigger than a hazelnut, lying in the palm of my hand, as it seemed to me, and it was as round as a ball. I looked at it with the eye of my understanding and thought: What can this be? I was amazed that it could last, for I thought that because of its littleness it would suddenly have fallen into nothing. And I was answered in my understanding: It lasts and always will, because God loves it; and thus everything has being through the love of God. —Julian of Norwich
from ***Julian of Norwich: Showings***

•

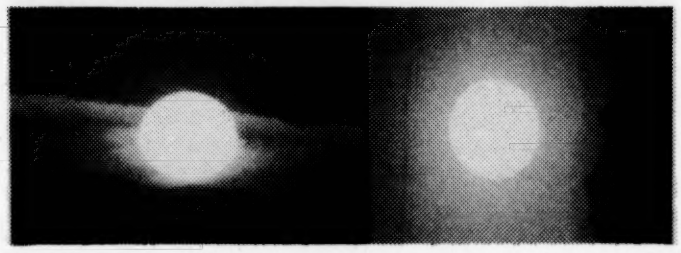
Moreover when the Lord sent me forth into the world, he forbade me to put off my hat to any, high or low; and I was required to "thee" and "thou" all men and women, without any respect to rich or poor, great or small. And as I travelled up and down, I was not to bid people "good morrow" or "good evening," neither might I bow or scrape with my leg to any one; and this made the sects and professions to rage. But the Lord's power carried me over all to his glory, and many came to be turned to God in a little time, for the heavenly day of the Lord sprang from on high, and brake forth apace by the light of which many came to see where they were. —George Fox
from ***Quaker Spirituality***

The Classics of Western Spirituality
John Farina,
Editor-in-Chief

$10.95
average postpaid price
from:
Paulist Press
545 Island Road
Ramsey, NJ 07446

Sunsets, twilights, and evening skies

STEWART BRAND: *Is it intimations of a gorgeous death, or revelling in the seamless gradation of blazing horizon to a starry dark, or the lifelong scout for the green flash that keeps us gazing and gazing on sunsets? Part of the attraction surely is the spectacular variety. This book's color photos and clear explanations can serve as a sort of field guide of twilight special effects — green flashes, noctilucent clouds, zodiacal light, volcanic dust leading to Bishop's rings and blue suns, and the Earth's own shadow climbing the fading eastern sky. Is there a more universal ceremony of planethood than watching the sun set and, by profound implication, rise?*



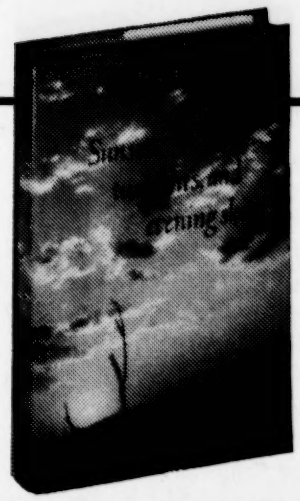
Oblateness of the setting sun viewed normally and viewed with 90° rotation.

•

Noctilucent clouds are clouds that remain sunlit long after sunset. This indicates that they are at a very great height. Natural noctilucent clouds are rare, occurring only at high latitudes in the late summer, and are therefore seldom reported except from northern Europe, Canada, and Alaska.

•

If one had ideal conditions — a sharp horizon, perfectly clear air, homogenous atmosphere, and an expanded



Sunsets, twilights, and evening skies
Aden & Marjorie Meinel
1983; 173 pp.
$29.95
postpaid from:
Cambridge
University Press
510 North Avenue
New Rochelle, NY 10801
or Whole Earth Access

time sensitivity to slow the solar motion — one would see the dazzling strip of sun change from normal by the successive subtraction of first red, then yellow, then green, with the remaining glint pure violet-blue. The combined effect of the remaining light during this change is to see progressively a yellowish, then a greenish image, and finally the pure color of the remaining blue. Knowing what to expect, we have clearly seen the progression.

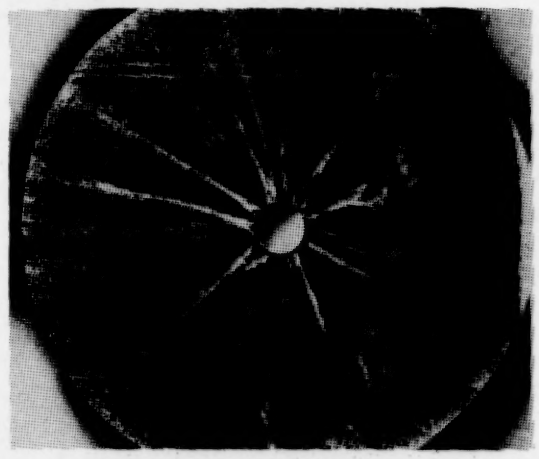
Convoluted rocket trail seen from El Centro, California.

Beyond Vision

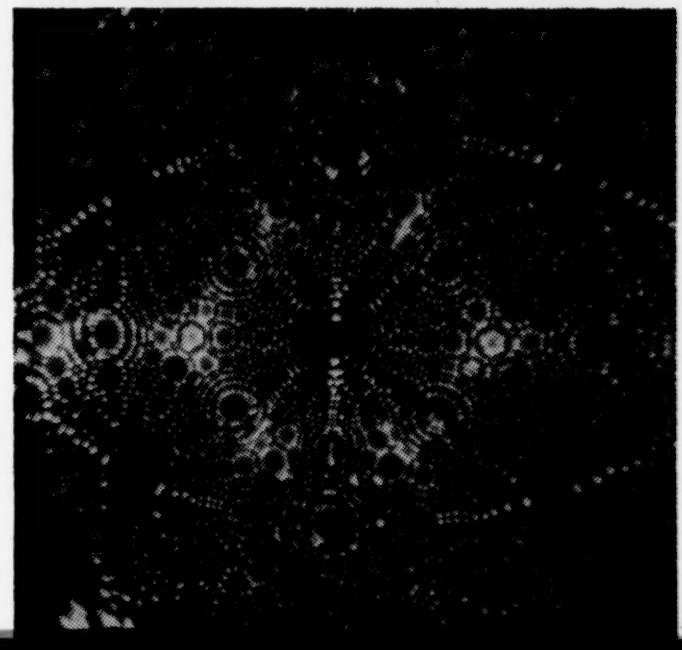
KEVIN KELLY: *Photography has not merely documented the news in the last century, it's invented a lot of it. Tiny grains of Kodak silver bend more than light: images, like that of the whole Earth turning in space, bend minds. Our first glimpses of viruses, of how animals run, of forgotten life pulsing at the bottom of remote seas, have all arrived through the lenses of photography. In the world of the very large and the very small our knowledge is almost entirely photographic. This portfolio ambitiously gathers the best scientific photographs to date. Here are the first X-rays, some of the first aerial survey photos, the first snapshots of actual atoms, the first views of a living fetus in the womb — and so on, one hundred photographs thick. This is the kind of human family album you hand to galactic aliens.*

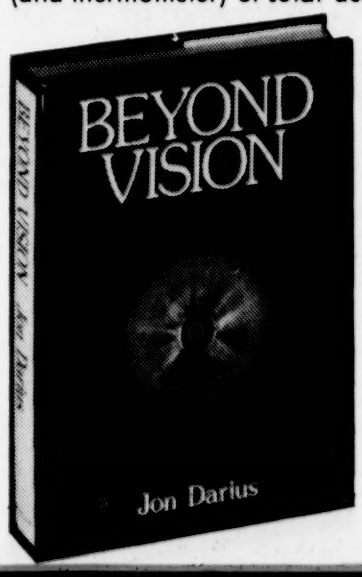
•

The Sun oscillates between relative quiescence and flaring acitivity on some multiple of an 11-year cycle. The corona, produced by the flux of energetic particles streaming form the Sun, serves as a good barometer (and thermometer) of solar activity. Seen at solar minimum, the corona resembles a halo distended at the equator and accompanied by short straight plumes at the poles. At solar maximum the corona manifestly expands, abandoning its sober symmetry and projecting streamers far out from the solar limb.



Tungsten crystal surface magnified about 10 million times with a resolution of about 3 angstroms. Each luminous spot is an atom, and the pattern of the crystal lattice is remarkably clear.





Beyond Vision
(One Hundred Historic Scientific Photographs)
1984; 224 pp.
$29.95
postpaid from:
Oxford University Press
Attn: Order Department
16-00 Pollitt Drive
Fair Lawn, NJ 07410
or Whole Earth Access

Field Guide to the Birds of North America

PETER WARSHALL: *After much comparison and birder chit-chat, I hesitantly accept the* ***National Geographic Field Guide to Birds of North America*** *as the best on the market. Without writing a book about bird books, here are the essentials:*

In the eastern region, beginners should use the familiar ***Birds*** *by Roger T. Peterson (although it has its own problems). The* ***Geographic*** *guide is too jargony, too full of casual or vagrant species which unnecessarily distract the novice. And it grossly lacks good comparison pages (for fall warblers, for instance). In the western region, the* ***Geographic*** *leads the V-flight. It has some good pictures of western races found in no other guide and is excellent on western gulls. For experienced birders who will try to identify everything — including the vagrants, the shearwaters, and the immatures — the* ***Geographic*** *guide replaces the Golden Guide* ***Birds*** *by Herbert S. Zim and Ira N. Gabrielson (another standard), as well as Peterson.*

In addition, I want to sing praises to Donald Malick, a relatively unknown bird painter whose sense of woodpeckers and hawks comes from life, not from the museum. This book is worth buying for his renditions alone. (However, some of the other 13 artists' illustrations leave one with the feeling of bird number-paintings.) If you want to know something beautiful about birds, besides how to identify them, buy another book like Audubon's ***Encyclopedia of Birds****.*

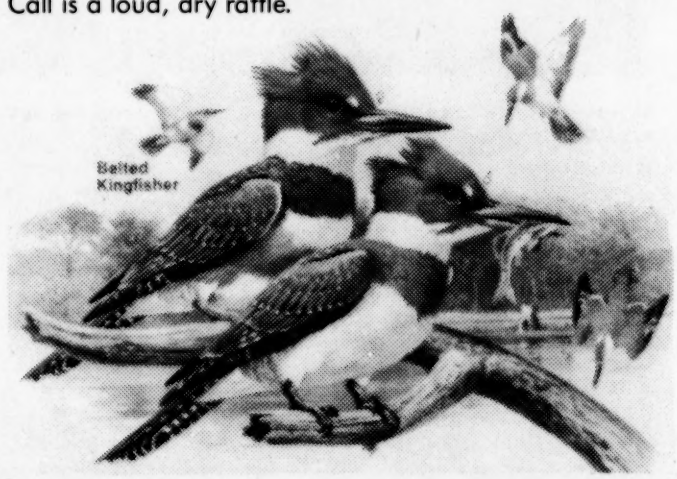
The ***Geographic*** *book is not available through commercial book-dealers and must be purchased from National Geographic or at select nature stores like your local Audubon education center.*

[Suggested by Captain Walker]

Field Guide to the Birds of North America
National Geographic Society
1983; 464 pp.
$16.95
postpaid from:
National Geographic Society
Washington, DC 20036

•

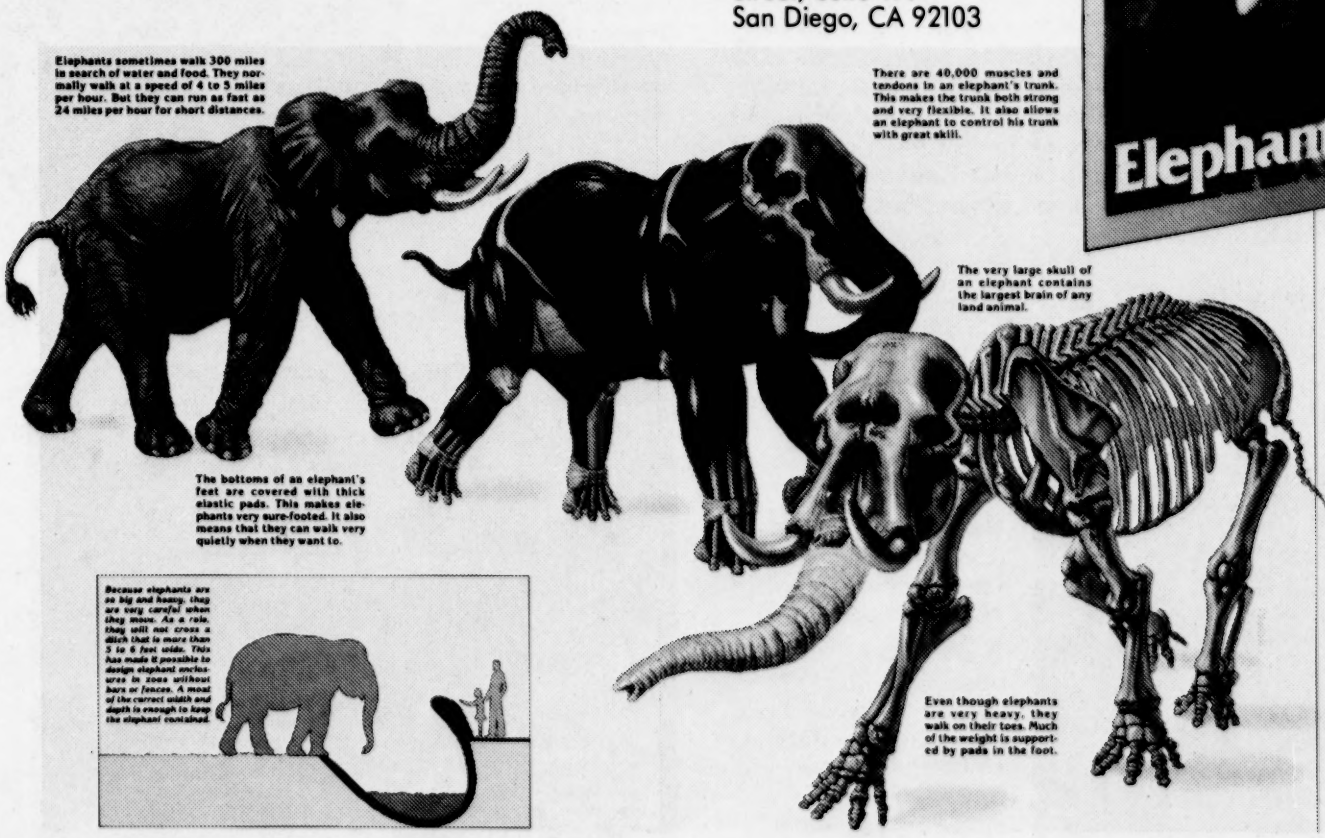
Belted Kingfisher *Ceryle alcyon L 13" (33 cm)*
The only kingfisher seen in most of North America. Both male and female have slate blue breast band. Female has rust belly band and flanks, may be confused with female Ringed Kingfisher where ranges overlap; note white belly and undertail coverts. Juvenile resembles adult but has rust spotting in breast band. Common along rivers and brooks, ponds and lakes, estuaries, perches conspicuously. Solitary except in nesting season. Call is a loud, dry rattle.



Zoobooks

PETER WARSHALL: *Not since* ***Ranger Rick*** *have kids (and adults) been treated to such an entertaining magazine on wildlife. Cheap, beautiful, informative, and passionate. As in nature study, seeing a copy is more convincing than a persuasive blurb.*

Zoobooks
John Wexo, Editor
$14/year (10 issues)
from:
Wildlife Education, Ltd.
930 West Washington Street, Suite 114
San Diego, CA 92103


Elephants sometimes walk 300 miles in search of water and food. They normally walk at a speed of 4 to 5 miles per hour. But they can run as fast as 24 miles per hour for short distances.
There are 40,000 muscles and tendons in an elephant's trunk. This makes the trunk both strong and very flexible. It also allows an elephant to control his trunk with great skill.
The very large skull of an elephant contains the largest brain of any land animal.
The bottoms of an elephant's feet are covered with thick elastic pads. This makes elephants very sure-footed. It also means that they can walk very quietly when they want to.
Because elephants are so big and heavy, they are very careful when they move. As a rule, they will not cross a ditch that is more than 5 to 6 feet wide. This has made it possible to design elephant enclosures in zoos without bars or fences. A moat of the correct width and depth is enough to keep the elephant contained.
Even though elephants are very heavy, they walk on their toes. Much of the weight is supported by pads in the foot.

The Freshwater Aquaculture Book

RICHARD NILSEN: *Aquaculture is one of those subjects where a lot of technical advances have been made in the last twenty years, yet this book begins with a picture of a Chinese polyculture fish pond that probably could have been taken when Confucius was alive if anybody had a camera. Faced with early population pressure, the Chinese, in the words of the author, "wisely came to the conclusion that some land was most productive under water."*

This book deals with just about anything that moves in freshwater and is big enough to bite — fish species plus frogs, crayfish, shrimp, and clams. Normally, to get the kind of comprehensive information this book contains you would have to go to several books, and most of them would be aimed at the fellow who wanted to know how to go about raising 30 acres of catfish in ponds. But as with agriculture so with aquaculture: a small pond provides "the best combination of productivity and manageability."

Author McLarney has worked for the New Alchemy Institute on aquaculture in both Massachusetts and Costa Rica. His ***Back Yard Fish Farm Book*** *(**NWEC**, p. 110) is a brief look at growing fish in cages. This new book is more like a bible.*

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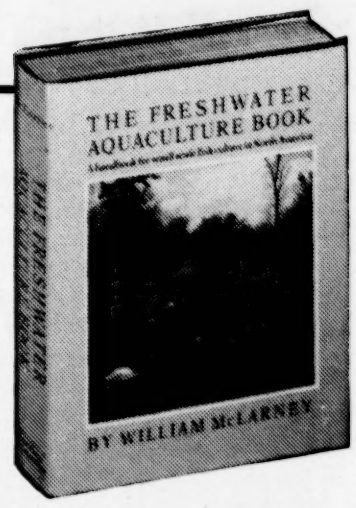
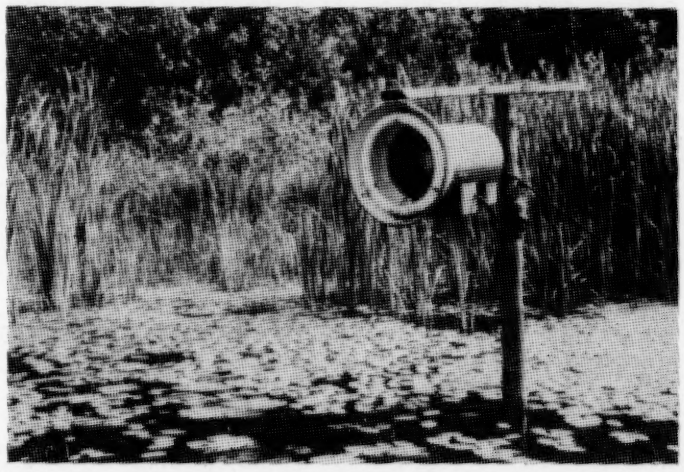
A useful rule of thumb in planning a trout farm is that the flow rate should be sufficient to provide at least one complete exchange of water per hour at whatever time of year the water is both warmest and least abundant. The rate of flow is determined not only by the size of the trout pools and the volume of water delivered at the source, but also by the shape of the pools and the topography of the site. . . . For this reason, circular pools are preferable to square ones.

•

An ingenious combination of cage culture and trapping was developed in Japan. Rainbow trout placed in cages in the ocean were trained to associate the sound of a buzzer with feeding. When the fish were well trained, the cages were opened, allowing them access to the sea. Daily feedings at the sound of the buzzer continued. At harvest time the buzzer was sounded and the cages closed with the fish inside. In this way the trout received a combination of artificial and natural feed, and reached weights of 2.6 pounds (1.2 kg) in one year and 4.4-5.5 pounds (2-2.5 kg) in two years.

The Freshwater Aquaculture Book
(A handbook for small scale fish culture in North America)
William McLarney
1984; 594 pp.
$40
postpaid from:
Hartley & Marks, Inc.
P. O. Box 147
Point Roberts, WA 98281
or Whole Earth Access





"Will-o-the-Wisp" bug light fish feeder installed on a farm pond in Wisconsin. Nocturnal flying insects are attracted to the U-V light tube, sucked in by an impeller fan and blown down through the chute at the back of the unit and into the water.

The Book of Edible Nuts

RICHARD NILSEN: *This is the kind of book that contains its own time-warp — you pick it up, start flipping through the pages reading photo captions, and hours disappear. It is economic botany from a worldwide perspective, lavishly illustrated and engagingly written. From chestnuts to cola nuts to watermelon seeds, this book explains where and how to grow, harvest, and prepare 42 kinds of nuts, seeds, and beans. Librarians take note.*

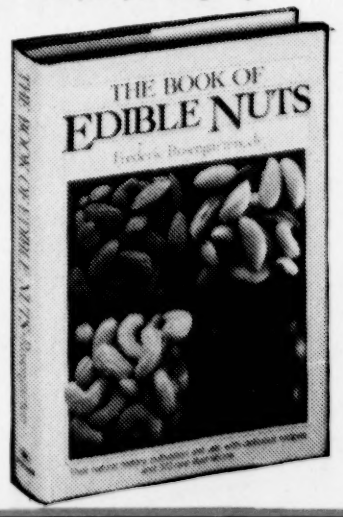
•

An historical quirk in Russia is credited with the first large-scale adoption of sunflower as a food and edible oil. In the early nineteenth century, the Holy Orthodox Church of Russia decreed very strict dietary regulations during Lent and the forty days preceding Christmas: nearly all foods rich in oil were proscribed by name and forbidden. Since sunflower had only recently been introduced to the country and was virtually unknown, it was not on the prohibited list. The people eagerly adopted it as a food and source of oil, all the while complying with Church regulations. Sunflower became extremely popular. . . . At the turn of the century, sunflower had become a major Russian agricultural product. Russia took the lead as the world's leading sunflower-growing country and has held that position ever since.

•

Cashew has been called a poor man's crop but a rich man's food. The World Bank has estimated that at least 97% of world cashew production comes from wild growth and small peasant holdings — while at the most 3% is supplied by systematically planned plantations.

The Book of Edible Nuts
Frederic Rosengarten, Jr.
1984; 409 pp.
$36.75
postpaid from:
Walker and Company
720 Fifth Avenue
New York, NY 10019
or Whole Earth Access



Cashew apples and nuts hanging on mature tree in India.

•

The hard seed or kernel of the betel, miscalled a "nut," is a masticatory; it is not swallowed but is chewed in much the same way as plug tobacco. The chewer of the betel nut derives a mild narcotic effect from it. Betel ranks as one of the world's major stimulants. It is estimated that at least ten per cent of the human race indulges in the habit of betel nut chewing — some 400 million people from India and southeast Asia to the central Pacific islands, East Africa, the Philippines and southeastern China. On a global basis, it is more popular than chewing gum.

23 years of betel-nut chewing in Bangkok have turned this woman's teeth black, and the inside of her mouth brown. Betel-stained teeth, formerly considered as beautiful as "dark sapphires," are no longer regarded as symbols of beauty.

Menopause, Naturally

ROCHELLE PERRINE SCHMALZ: *This book is a positive, joyous approach to what traditionally has been considered a time of life to be dreaded. Greenwood coins the term PMZ or "post-menopausal zest" and emphasizes the many possibilities open to women after the childbearing years are completed. The physical as well as emotional aspects of the menopause are discussed: how to cope with hot flashes, depression, vaginal dryness, osteoporosis, etc. through diet (great charts on calcium contents of food) and exercise. Two chapters are devoted to the pros and cons of estrogen replacement therapy and an ERT personal rating scale is included. The younger woman who experiences premature menopause — either surgically or naturally — is often forgotten, but* ***Menopause, Naturally****, considers her unique situation.*

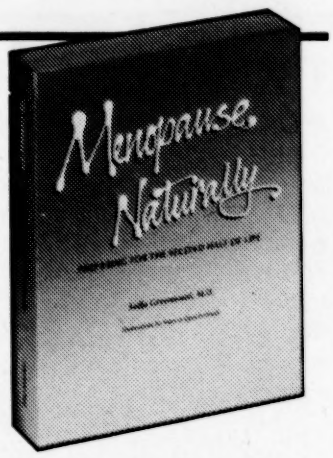
•

In Western culture, with its strong emphasis on female youth and beauty, the menopause is seen as a time of decline and loss of status for women. . . . Among many non-Western groups, the older woman enjoys increased status in the family and greater freedom in society at large. Menopause and the cessation of childbearing become positive events in a woman's life, and physical symptoms are given less attention.

•

New findings about post-menopausal ovaries are causing many doctors to change their views on the routine removal of healthy ovaries along with the uterus. The various hormones secreted by the ovaries in middle and old age contribute to well-being in many ways, and can*not* always be duplicated by pills. For example, after ovarian removal some women find estrogen pills do not restore their sex drive or their strength and well-being. They must also take androgen pills to fully regain their sexual interest, and thereby run the risk of growing excess hair and experiencing other side effects.

Menopause, Naturally
(Preparing for the Second Half of Life)
Sadja Greenwood, M.D.
1984; 201 pp.
$11.25
postpaid from:
Volcano Press
330 Ellis St.
San Francisco, CA 94102
or Whole Earth Access



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In addition to paying attention to calcium in the diet, women should take calcium supplements after the menopause. It is widely recommended that women take 800 milligrams to one gram of elemental calcium daily. Some have suggested that this practice begin at age 35, so women will enter the menopause with bones of maximum strength. When calcium tablets are taken regularly for several years, there is evidence that older women can actually gain bone strength rather than continue to lose it.

Can You Prevent Cancer?

ROCHELLE PERRINE SCHMALZ: *Dr. Rosenbaum, a well-known San Francisco oncologist and author, has written this book to help the layperson adopt life-style habits which contribute to cancer prevention. He discusses cancer screening, environment and occupational risks, genetic susceptibility, and, most significantly, nutrition and cancer. There is also good hard-to-find information on the relationships between cancer and stress, personality type, and sexuality. Included are a cancer risk analysis/health history questionnaire, good charts, reliable statistics, and a detailed bibliography. This is the book to help you allay your cancer fears.*

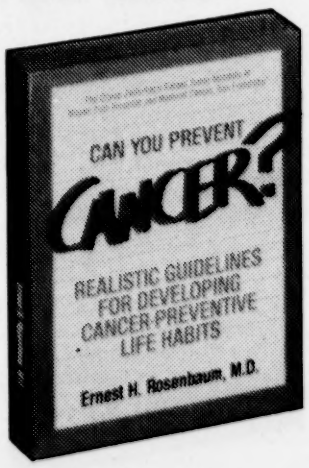
•

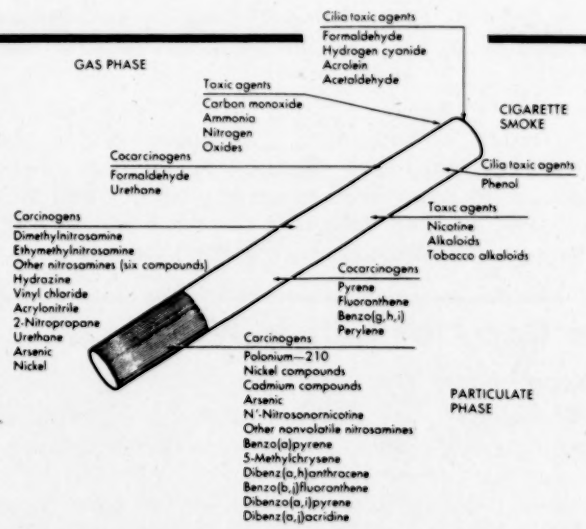
Cancer is often viewed as a thunderbolt of fate, striking at random with no cure or cause. This is *not* true. Many effective ways of treating cancer now exist, and more are being researched all the time. We also know more about the causes of cancer and that certain substances or life-style habits greatly increase the risk of cancer or actually cause cancer. Thus individuals can take specific steps to reduce their risks of cancer.

•

The *occult blood test* done at home requires the patient to use wooden sampling sticks and to smear a small amount of stool on special filter cards. These are stored in a cardboard container in a cool, dry place until brought to the physician or screening center within 5 days. Many large-scale studies have proved the benefit of occult blood testing in detecting colon cancer.

Can You Prevent Cancer?
(Realistic Guidelines for Developing Cancer-Preventive Life Habits)
Ernest H. Rosenbaum, M.D.
1983; 310 pp.
$9.95
postpaid from:
C.V. Mosby Company
11830 Westline Industrial Dr.
St. Louis, MO 63146
or Whole Earth Access





The chemical anatomy of a cigarette: toxic gas and particulate phases of cigarette smoke.

•

A person who drinks *and* smokes pushes his risk of cancer up to 15 times the average rate. According to K. Rothman, this is two and one half times the expected risk ratio for oral cancer if the effects of alcohol and tobacco were only additive. *The smoking/alcohol combination accounts for 75% of all oral cancer.*

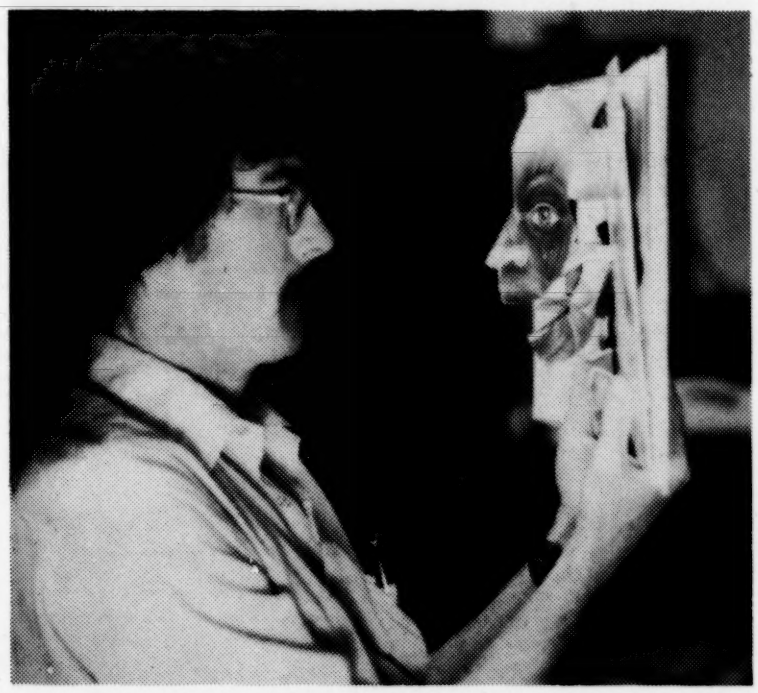
•

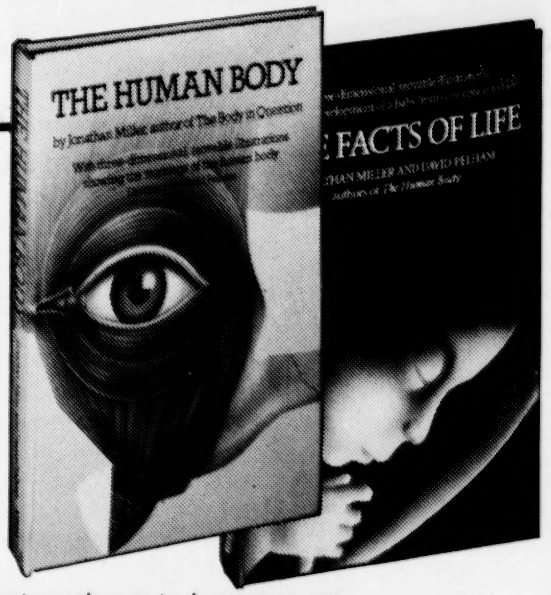
Although pollution of the air and water, industrial exposure and contamination, and radiation or pesticides receive the greatest media coverage as cancer threats, the most effective approach to avoiding cancer comes from personal life-style choices. Probably no more than 10% of cancers relate to occupational-environmental hazards, and another 2% may be caused by heredity. Prudent daily living patterns with appropriate changes in personal behavior toward a more healthy life-style seem to be the most important preventative steps you can take.

The Human Body

The Facts of Life

KEVIN KELLY: *Open up either of these startling books and you get eye-popping models of flesh, bones, tendons, gonads. On the first page of* ***The Human Body*** *a life-size head jumps out, wagging its tongue between jaws, and exposing muscles that tug its eyeball. (I saw a big bone in there I didn't know we had, directly behind our eyeball.) On the second page there are working simulations of the inner ear hearing sounds, and further on the lung's diaphragm bellows-ing in air, all ingeniously cut out of paper that assembles together as you open each page. A dazzling hemisphere of an unfertilized human egg pops out to meet wriggling sperm when you leaf through* ***The Facts of Life****, a gem of biological origami. Short of wielding your own scalpel, these are an immediate route to understanding the arrangement and magnificent compactness of the human body.*





The Human Body • The Facts of Life
Jonathan Miller
and David Pelham
1983, 1984; 12 pp. ea.
$19.95 each
postpaid from:
The Viking Press
299 Murray Hill Parkway
East Rutherford,
NJ 07073
or Whole Earth Access

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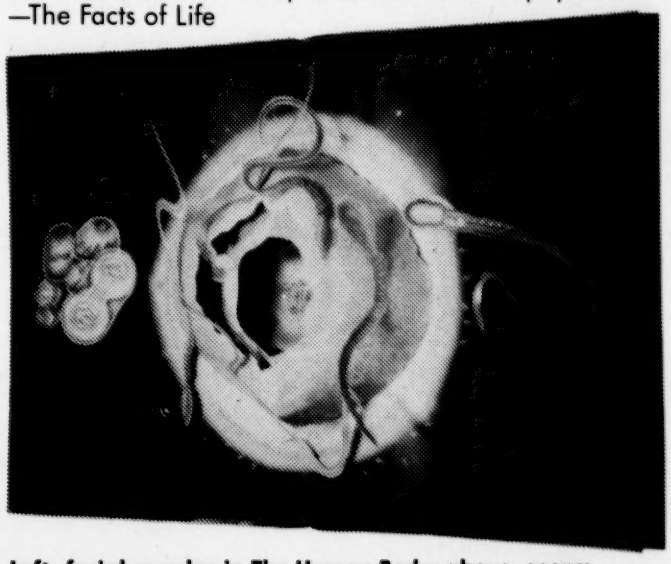
Moving at the rate of approximately one inch every twenty minutes the sperm advance into the warm darkness. Most of them drop away exhausted, but there will be more than enough survivors when the time comes for the final assault. Meanwhile, at the opposite end of the uterus a ripe egg cell has been launched from the ovary. Each egg cell, or ovum, is surrounded by a halo of about 6000 nurse cells which have come away with it during ovulation. These nourish and protect the valuable payload.
—The Facts of Life



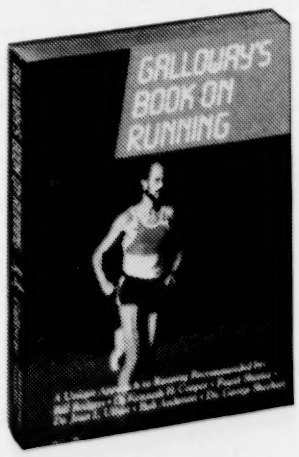
Left, facial muscles in *The Human Body*; above, sperm attacks ovum in *The Facts of Life*.

Galloway's Book on Running

DICK FUGETT: *Back in the dark ages of running — ten years ago — the only way to learn was by making your own mistakes and then attempting to figure out what had gone wrong. Sooner or later the dedicated runner experienced everything from tendonitis and failed knees to orthotics and the high cost of sports medicine. Those who were lucky are still running while those who were not are lame forever.*

If books like this had been around there'd be more old runners running and fewer of us sitting around wishing we'd known then what we know now. Galloway, a former Olympic team member, covers everything from training and injuries to physiology and nutrition in an easy to read volume that is as relevant to a casual jogger as to an experienced marathoner. In addition, he has anecdotes from 25 years of running that give the book both a personal flavor and an inside look at what it's like at the top.

Galloway's Book on Running
Jeff Galloway
1984; 287 pp.
$9.95
postpaid from:
Random House
Order Department
400 Hahn Road
Westminster, MD 21157
or Whole Earth Access



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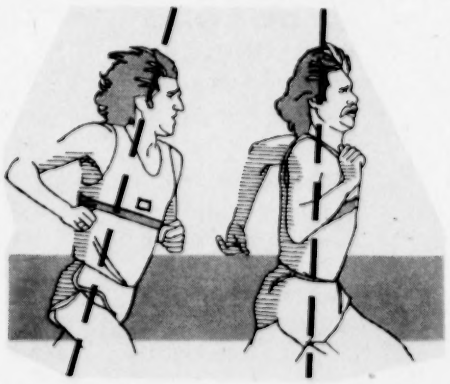
Stride Length. Believe it or not, a longer stride will not lead to faster running. *Experienced competitive runners find that their stride length shortens as they run faster.* A key to faster running is stride frequency. If you increase the speed of your footfall and get a good strong pushoff you'll improve. Most runners I've worked with have too long a stride.

•

Running in a Swimming Pool. This exercise simulates running better than any other activity and can keep you in fine condition. Many athletes who couldn't run for 3-4 weeks have come out of the pool and run their best times ever.



The most efficient way to run is to have your head, neck and shoulders erect, as at right. When you run leaning forward, as at left, you're always fighting gravity.

The Only Investment Guide You'll Ever Need

STEWART BRAND: *I'm chagrined that I had to wait till this updated (1983) edition of the original 1978 book to find out how true the title is.*

There are a lot of problems with personal investing that don't meet the greedy eye but can clutter up your life good. If someone else handles your investments, you feel uncertain, out of control, vulnerable. If you do it, you feel uncertain, ignorant as hell, that you're constantly missing the big score, and that you're getting beaten up by professionals. Both the worry and the machinations drain your time and joie de vivre. Money feels the opposite of freeing.

Andrew Tobias cuts through all that. The book is a brisk, cheery compendium of highly sophisticated common sense. The most efficient way to make money, he reminds right at the start, is not to spend it. What with taxes and all, every extra $500 you spend a year requires about $1000 more income. Since your spending situation is probably easier to change than your earning situation, start there. As for investing itself, he preaches a bare-bones, conservative line — discount brokers, no-load mutual funds, a healthy Individual Retirement Account, and very little action. He's got good detailed tricks and tips (save money in your children's names and it'll mount tax-free), but the basic strategy is simple, slow, wise — freeing.

If you like his book, you may have good use for his software, MANAGING YOUR MONEY, reviewed on p. 85 of this issue. I regard it as the single best computer program I've seen — a genuine life-brightener. Among its other benefits, it led me to this book.

•

OK. You have some money in a savings bank; you have set up an Individual Retirement Account — and a Keogh Plan, if possible — and are contributing to them at the maximum rate allowed; you have equity in a home, if you want it; you've tied up $1,000 in bulk purchases of tunafish and shaving cream; you have lowered your auto and homeowner's insurance premiums by increasing your deductibles; you have adequate term life insurance; you've paid off all your 18% installment loans; there is a little solar water heater sitting on your roof above your well-insulated attic; and you own enough IBM (or some other solid common, or even preferred, stock) to take full advantage of the $100 ($200) dividend tax exclusion. In short, you have done all the things that scream to be done. You have made the easy decisions.

Now what?

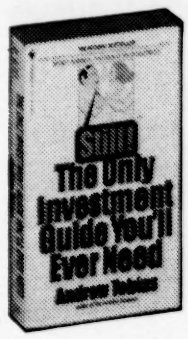
There are three compelling reasons to invest a portion of your funds in stocks.

1. *Over the long run — and it may be very long — stocks should outperform bonds. . . .*

2. *Unlike bonds, stocks offer at least the potential of keeping up with inflation,* even if that potential is by no means always realized. . . .

3. *If all goes well, stocks can act as a tax shelter. . . .*

The Only Investment Guide You'll Ever Need
Andrew Tobias
1983; 184 pp.
$5.20
postpaid from:
Bantam Books
414 East Golf Road
Des Plaines, IL 60016
or Whole Earth Access



Simple Living Investments For Old Age

STEWART BRAND: *The fabled baby boomers are inexorably becoming, for the rest of this century, a prodigious oldster boom. As they rewrote how to be young — hippies — and are rewriting how to have careers — yuppies — they will undoubtedly restyle how to be codgers and crones. This fine little book sounds the distant trumpet.*

No one can make the point better than ex-banker Michael Phillips that money is not the main ingredient of a graceful and interesting old age. Saving up for old age is a mind-cramping, career-cramping approach to ~~life~~ death. Better to build habits that pay off long before old age — fitness, friendliness, creative frugality, curiosity.

The detailed practicality of the book gives an interesting yield: radical wisdom.

•

The priority of investment choices are: health, friends, skills, an austerity test, and for salaried people a rental house to be sold at age 55.

Simple Living Investments For Old Age
Michael Phillips
1984; 43 pp.
$4.00
postpaid from:
Clear Glass Publishing
P.O. Box 257
Bodega, CA 94922
or Whole Earth Access

•

The trauma of death that we experience with the death of friends and acquaintances becomes more frequent as we age. Childhood friends die suddenly in their middle years, business peers, lovers and family die unexpectedly even now. These losses strike at our networks of support and our connection to the world. Often our professional providers, doctors, dentists and lawyers, are the first to die since they are usually older than we. The whole pattern of funerals, memorial services, and increasing isolation are extremely debilitating and sometimes create a dependence on our offspring (if we have any) and remaining friends that is humiliating. . . .

There are two natural conditions that allow us to attract young friends regardless of our age. One is gregariousness, a genuine interest in other people that they respond to, the other is to be such an interesting person that people seek us out (such as Bucky Fuller). If you have either of these conditions, read no further in this section. Old age will continue to be interesting. Friends will provide the excitement and raison d'etre.

Aside from these two natural conditions that generate friends there is also a short-cut available to a few people: marry someone who attracts them. If you're planning marriage in the future, consider putting 'lots of friends' on the list of qualities you seek in a mate.

For the rest of us, acquiring new younger friends will require deliberate, conscious and continuous effort.

Younger people associate with old people who have unique qualities that they find interesting. They avoid old people who have the standard qualities: fussy about food ('I hate most fresh vegetables'), fussy about surroundings ('I'd never sit on the floor . . . besides it's too drafty in here') and have rigid value systems ('I hope you don't associate with those godless pot smokers').

The Barter Network Handbook

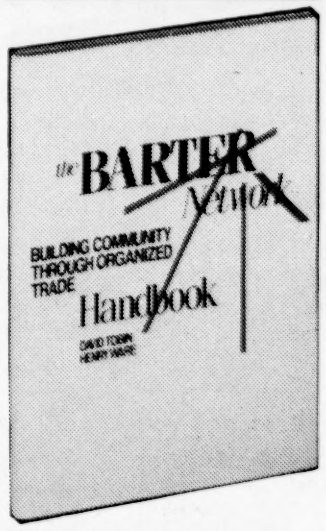
STEWART BRAND: *Another one of those slightly fusty do-gooder manuals, but the subject is one that, like open-air farmers' markets and (sometimes) recycling centers, can do a lot to connect a community. Sometimes you barter goods, but mostly people barter services; either way, you leave the IRS out of it. Village economics in an urban world, self-rewarding.*

•

Tom Glynn, assistant to the commissioner of the IRS, has conceded that many of the informal barter arrangements that take place between friends and neighbors carry no tax liability, since they fall into the category of "favors."

The IRS has ruled that members of barter "clubs," who receive credits valued at $1 each for services they perform, must report them as income when they are received, even though they may not make use of them until a later time. Credits possessing no monetary or "time-spent" income, however, have not been covered by any IRS rulings to date.

The Barter Network Handbook
(Building Community Through Organized Trade)
David Tobin and Henry Ware
1983; 77 pp.
$8.20
postpaid from:
VOLUNTEER Readership
1111 N. 19th Street
Arlington, VA 22209
or Whole Earth Access



Making Money Making Music

JAMES STOCKFORD: *This is a comprehensive and imaginative look at the many ways a musician can make money in his or her community, written by a drummer from Sacramento. He covers sales techniques, money managing, how to use the yellow pages, and other business skills very well. His section on negotiating with club owners for higher pay is beautiful. With a primary emphasis on performance opportunities, the book also explores teaching, writing jingles for local businesses, song writing, choir directing, and other overlooked money-makers.*

As a bonus, the author changes pronouns from he *to* she *democratically. An agent is "him," a manager "her," a singer "him," a club owner "her," and so on. He has randomly upset sex stereotypes, and the effect is startling and refreshing.*

I found this book very easy to read, inspirational, filled with practical ideas. Great references to other information sources end each chapter.

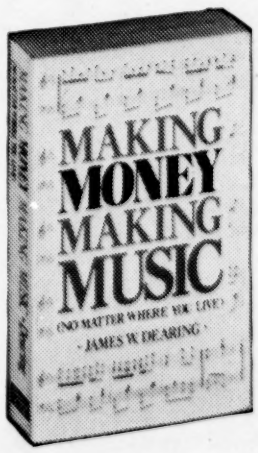
•

Almost without exception, the fewer musicians in a band, the more money you'll make. The exceptions are those places that pay a flat rate *per musician*, and they are few and far between.

•

After working in bands for many years, I've found that career direction is often ignored. It's just never discussed. The group never formally comes to a consensus as to what this business hopes to accomplish. It's always sad to see an act break up just because the singer expected something different from what the conga player did.

Making Money Making Music
(No Matter Where You Live)
James W. Dearing
1982; 317 pp.
$14.45
postpaid from:
Writer's Digest Books
9933 Alliance Road
Cincinnati, OH 45242
or Whole Earth Access



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Maybe the best reason for getting serious about rehearsing is that the pay isn't very good. Something like $00 an hour, minus transportation expenses. You need to make everyone conscious of the time so they'll regard rehearsals as a time to get things done.

•

Any price you're quoted is the *least* that person or organization can afford. Here's what one nightclub owner told me: "My auditor keeps me posted on how I'm doing, and how much I can afford. If she tells me I can afford $6,000 a month for entertainment, I'll only budget about $4,500, and plow the other $1,500 back into the business." If your band is making $1,200 a week, chances are good that your employer can pay you $1,400-$1,600 without needing to draw more customers. That's the amount he budgeted for you, but you didn't negotiate for it! You accepted his first offer, the $1,200.

Always regard a quoted price as a place to *start* bargaining. An offer is an offer, not a finalized, official figure. . . . You assume that they offer that much money to you for a good reason, but many times there isn't any reason at all. They just pick a figure out of the air and recite it to you in a very serious, confidential voice. They quote a low price in case you've got enough guts to hold out for more.

•

Some instructors expect teacher assistants to work for free. Even though the experience of directing a group of students is valuable if you intend to pursue a teaching career, you should be compensated for your time. Here's one possible solution: Agree to teach for free, on the condition that the teacher will refer any students looking for private lessons to you. This way, the fund-strapped school doesn't have to come up with any money, but you still get paid (although payment, if any, will be delayed). If the students like you and respect your musical ability, they'll want to take lessons from you.

•

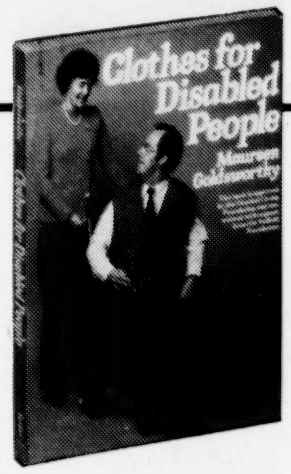
Producers also prefer to hire *proven* musicians over new talent. Why should they take a chance on an unknown when they've got a sure thing a phone call away?

•

The pressure is always on to be perfect. There's little room for errors. One of the simplest qualities producers want is the ability to play a part the same way over and over again, no experimenting. They want mechanically accurate players, yet the finished product has to sound lively.

Clothes for Disabled People

MARILYN GREEN: *A sympathetic book on fashioning attractive clothing for those with temporary or permanent physical disabilities. The chapters on adapting bought clothing to suit particular disabilities are especially good. Goldsworthy also presents a series of basic block patterns which are easy to fit to individual proportions and needs. There are several patterns for knitting and crochet. A section at the end of the book discusses ways to help disabled people dress themselves and suggests aids for sewing, knitting, and household tasks.*



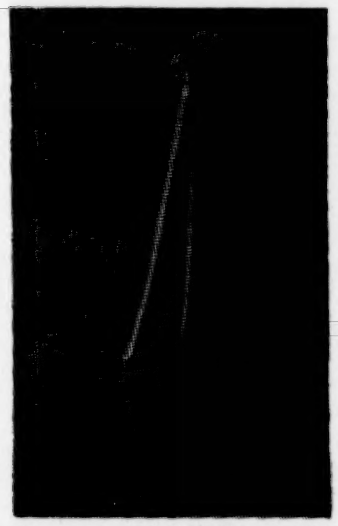
Clothes for Disabled People
Maureen Goldsworthy
1981; 117 pp.
$15.95
postpaid from:
David & Charles, Inc.
P. O. Box 57
North Pomfret, VT 05053
or Whole Earth Access

•

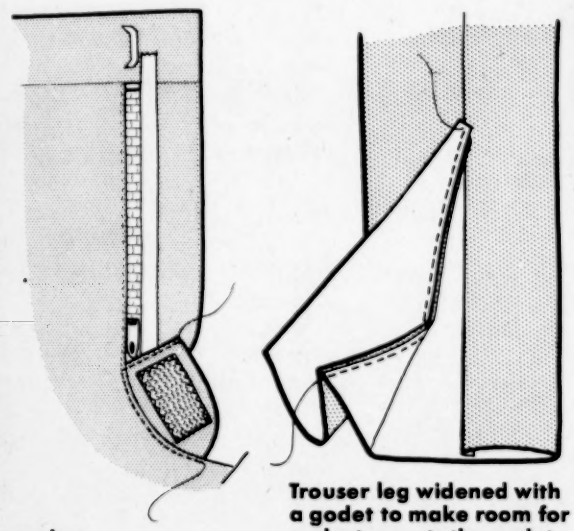
The usual length of a fly opening — 20 cm (8 in) — may not be long enough for convenience, particularly when using a bottle. It can be lengthened by taking out the zipper, opening the seam further down towards the crutch, and re-setting a longer, 25 cm (10 in) zipper. Or the zipper can be reversed to open upwards from the crutch, the top of the fly being left permanently closed. This is found by some men to be an easier arrangement, especially as the opening can then be further lengthened by using velcro.

•

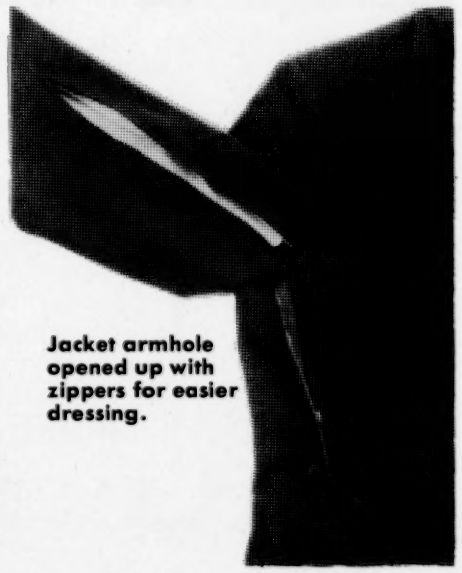
Temporary alteration for plaster cast. If the trousers normally worn are not wide enough for a bulky plaster, it is possible to let a godet into the trouser leg. This is a triangular insertion of fabric, narrowing to a point well above the knee. It may not be particularly good looking, but as a purely temporary measure it could get one into trousers not otherwise wearable. When the plaster comes off, the trousers can easily be altered back to their original lines.



Trousers with lengthened fly opening and reversed zipper.



Trouser leg widened with a godet to make room for a plaster cast; the godet can be removed later.



Jacket armhole opened up with zippers for easier dressing.

Weird Chairs

HANK ROBERTS: *I use a Balans Multi "kneeling" chair in my home for most of my proofreading and all of my computer work. I practically live in the thing. When my back first quit on me at age 13, the best medical advice was to sit up straight, sleep flat on my back, and never slouch. By the fourth time my back acted up, four years later, all the advice had changed — sleep with knees up on a pillow, slouch in regular chairs, stand with one foot on a stool as at a bar to work. All those things helped, as did drugs and acupressure.*

Kneeling chairs and acupressure are my only cures now — no more Valium! Sitting on the Balans chair (the Norwegian original) takes all the curve out of your lower back, keeps your knees lower than your hips while doing so, and lets you fidget enough to stay comfortable.

The Balans Multi is adjustable from drafting-table height to Japanese-table height. The other Balans chairs provide for fidgeting by having the knee pads on flexible curved rockers, so that each slight shift of your weight readjusts your sitting position.

There are cheaper, less flexible imitations of the Balans available — not Norwegian — for as little as $40; many computer magazines carry ads for them. Most lack the curved base and have one rigid knee pad; none are adjustable. I use a Taiwanese chrome version at the office, but after a while I feel like I've spent too long on a prayer bench in church.

[Suggested by Monte Blair]

Balans Multi—$165
Balans Variable—$165
Backsaver—$165
The Back Chair—$71
postpaid from
Whole Earth Access (p. 102)

The Balans Variable kneeling chair.

Cheesemaking

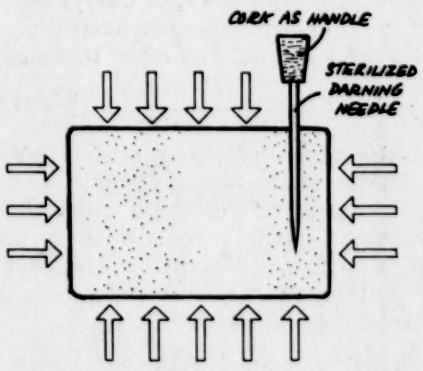
KEVIN KELLY: *Cheesemaking, like home brewing, seems eminently suitable to amateurs. Both are really small-time bacteria farming. A knack for gardening, or one similar, helps because you raise and breed whole populations of little beasties, and keep them fed and sheltered, in your kitchen.*

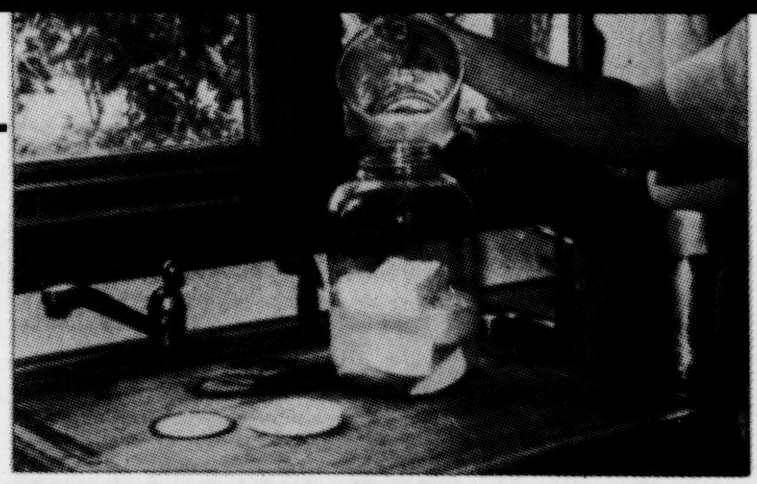
The complete and almost sole source for amateur cheesemaking information and tools is New England Cheesemaking Supply Company. Their ***Cheesemaker's Journal*** *is an encouraging bimonthly with just the right mix of how-to tips, recipe swaps, and new improvements in the art.* ***Cheesemaking Made Easy*** *is where to start. Together with an abundant supply of milk you can roll out hard, soft, salty, moldy, quick, or old cheeses. With well-aged confidence the book* ***Home Dairying*** *tells how to produce recognizable cheeses as well as their next of kin: cream, yogurt, and butter.* ***Goat Cheese*** *is the whole story on small-scale goat cheese brewing written by the Nuns of the Benedictine Monastery of Mount-Laurier, France. New England Cheesemaking Supply Company's catalog stocks the necessary gear — tough plastic cheese molds, rennet paste, cultured bacteria — anything you need.* *[Suggested by Walt Noiseux]*

•

Blue moulds: For the home cheesemaker perfectly good results can be obtained by using a piece of shop-bought blue cheese, breaking it up into small particles and mixing with water as a starter. Alternatively, small particles of the mould from a shop cheese can be sprinkled onto the curds at the salting stage. Once the cheese is shaped, the mould must have air in order to grow properly. The easiest way of ensuring this is to make holes in the cheese with a sterilized stainless steel needle; a kebab skewer easily available in most kitchen suppliers is ideal for this . . . **—Home Dairying**

Making aeration holes for blue cheese.
—Home Dairying





Packing the feta cheese into a jar of salt water brine. **—Cheesemakers' Journal**

•

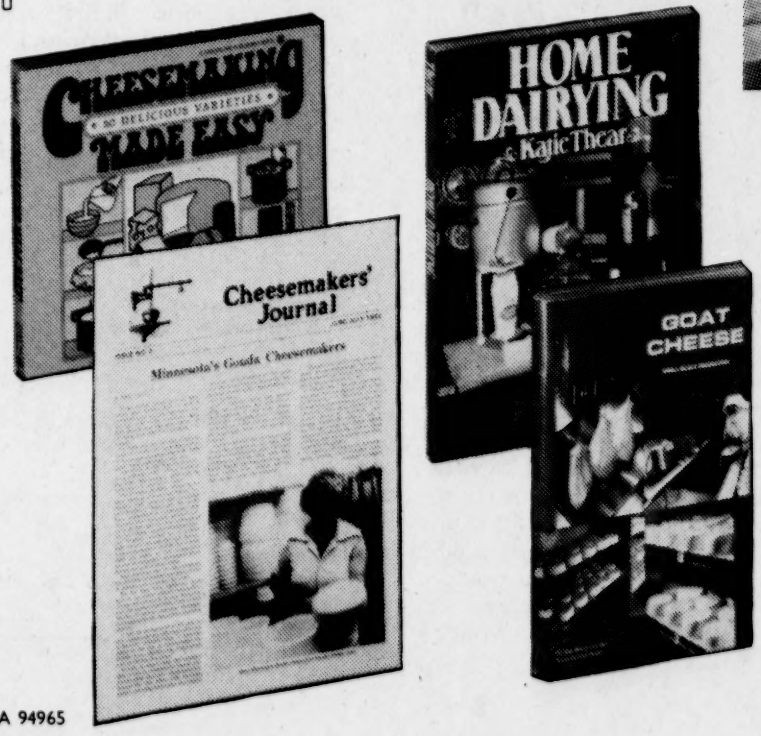
Fresh curd consists primarily of casein and fat. If the proper conditions required for each variety of cheese are provided during the ripening process, these substances are changed and broken down into simple compounds which develop the taste, soften the texture and increase the digestibility of the cheese.

In this particular instance, the change occurs primarily from the outside of the cheese to the center and is induced by the *Penicillium candidum*, a mold with white spores belonging to the Ascomycetes family in which the mycelia are septate. This mold or fungus grows wild in the Brie country of France. Particularly active and pure strains have been selected and are now supplied by laboratories that guarantee the quality of the strains.

—Goat Cheese

Milk is warmed in stainless steel cheese pots heated by warm water in a tub. Curd is eventually poured into cheese forms which rest on a tray that drains whey into the tub.
—Goat Cheese

To store culture, freeze it in sterilized ice cube tray. **—Cheesemaking Made Easy**



New England Cheesemaking Supply Company
Catalog
$1.00

Cheesemaking Made Easy
Ricki and Robert Carroll
1982; 143 pp.
$7.45

Cheesemakers' Journal
Robert and Ricki Carroll, Editors
$8.00/year (6 issues)

Home Dairying
Katie Thear
1983; 96 pp.
$11.45

Goat Cheese
(Small-Scale Production)
The Mont-Laurier Benedictine Nuns
1983; 95 pp.
$6.45

postpaid from:
New England Cheesemaking Supply Company
P.O. Box 85
Ashfield, MA 01330

or Whole Earth Access

27 GATE FIVE ROAD SAUSALITO CA 94965

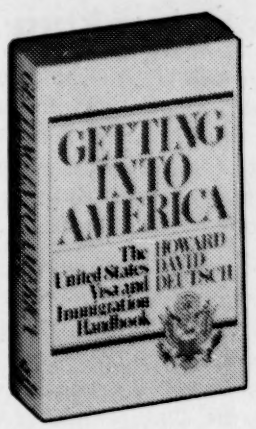
Getting Into America

KEVIN KELLY: *As any international vagabond will tell you, the most difficult country to legally visit is the USA. Young student travelers from Europe or elsewhere aren't granted the ease we have in visiting their homelands. Getting into America — and staying here, if you care to — is a complex game, and how well you do depends in part on when and where you begin.*

While traveling overseas, I have been asked "how to get in" many, many times. Now that we are cresting a decade-long wave of immigration (mostly from Asia), foreign students and refugees in the States are asking how to "naturalize." This knowledgeable and sympathetic book tells how to enter, work, and remain in the U.S., legally. It covers all that petty, annoying detail thoroughly without legal jargon. Written by an expert immigration lawyer, it's more helpful than most of his colleagues in indicating which questions are important.

I'm embarrassed at how little I knew about how to join our 200-year-old experiment here.

Getting Into America
(The United States Visa and Immigration Handbook)
Howard David Deutsch
1984; 310 pp.
$10.95
postpaid from:
Random House
400 Hahn Road
Westminster, MD 21157
or Whole Earth Access



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If you slipped over the border and came in illegally in the first place, under the law you're not officially in this country, and therefore you can't change your status, although it's possible for you to get a preference. You also are entitled to less in the way of due process. But if you came here on some kind of visa and stayed on after it expired, there's hope for an adjustment of status — that is, if you didn't work illegally in the meantime. You are also entitled to due process.

•

Many people who could actually get to the United States in other ways believe that it's easier to enter as a visitor, to stay illegally while an application for domestic work is pending, and then, after the Green Card is issued, find other suitable employment. Such is the case with many women who have little or no qualification for work in this country. Thousands of young women from Europe enter each year, only to find an overcrowded job market; they realize swiftly that employment as a domestic worker is a relatively easy if not necessarily quick avenue to residence.

•

Immigration law presumes that in the absence of positive evidence that you don't intend to remain in the United States permanently, it will be assumed that your intention is *not* to leave. This can be a very damaging presumption, because if a consular official is convinced you intend to stay permanently, he cannot and will not give you a nonimmigrant visa, sometimes without any explanation.

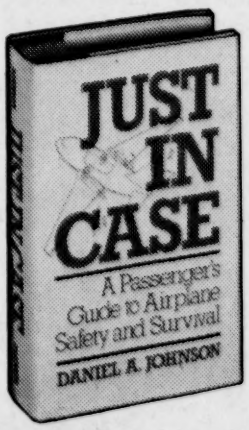
•

It's essential to be truthful, needless to say. But you must also be wise enough to understand that bureaucracies deal badly with *too much* information. For example, if you make a statement about your business, say as little as you can and be prepared to prove later whatever you set down. Don't say or write anything more than the forms specifically demand.

Just in Case

STEWART BRAND: *Everything you always dreaded about air travel all in one handy manual. I'd be interested to know if it helps aerophobes by so informing their fears that they flip out of the panic of helplessness into active competence. (If you read it on the plane, you may cure your problem but give it to the passenger next to you.) The book has truly fascinating lore. How people behave in emergencies. Dealing with the multiple hazards of fire. Post-accident stress. Where is safest to sit (over the wing or in the rear, near an exit).*

Just in Case
(A Passenger's Guide to Airplane Safety and Survival)
Daniel A. Johnson
1984; 284 pp.
$16.95
postpaid from:
Plenum Press
233 Spring St.
New York, NY 10013



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Sixteen passengers and two pilots were in the third Twin Otter, which crashed on the approach to the Knox County Regional Airport, near Rockland, Maine, on May 30, 1979. One of the passengers was a sixteen-year-old boy seated near the rear of the plane. There had been no warning of a problem and most passengers were sleeping or reading. Suddenly the boy, who was looking outside, saw that the aircraft was going to crash into trees. He quickly lowered his head and braced his arms and knees against the seat in front of him. And although his seat, along with most of the other seats in the plane, was torn from the floor during the tremendous impact, he suffered only a fractured wrist and leg, as well as a scalp wound. The other seventeen people were killed.

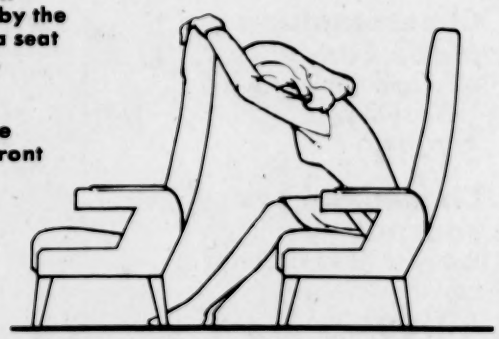
•

Probably the best brace position for most passengers is shown in Figure 6.3. After fastening your safety belt and pulling it tight, lean forward and place your crossed arms on the seat in front. Press your head against your arms. Put your feet as far forward as they will go, but try not to put them underneath the seat in front of you, for if the seat collapsed it could injure your feet.

A brace position will most effectively reduce injuries if you place your head, arms, and legs as closely as possible to where they would be forced in the accident. In most high-impact plane accidents you will be thrown forward and probably downward. In some accidents a considerable sideways force is exerted on the passengers if the plane slides sideways and then suddenly stops. Few accidents have exerted significant upward or backward forces on passengers.

A brace position recommended by the FAA if there is a seat in front of you.

(Don't try this position if there isn't a seat in front of you.)



The Complete Walker III

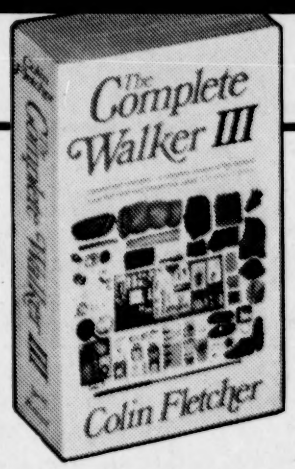
*J. **BALDWIN:** This venerable book has been around just about as long as the **Whole Earth Catalogs**, and like them, has been updated from time to time in order to keep current. The III version is a genuine revised edition; the editors claim it's 75 percent new. The latest in technotwitics are considered in detail after being subjected to Mr. Fletcher's traditional field testing. The material he has found worthy over the years remains intact, complete with a laconic humor sorely missing from most Deadly Serious Hiker writing these days. This and the hype-free comments on equipment and procedure give the book an unmatched feeling of trustability. Usefulness is aided by a remarkable cross-referencing in the text that makes the overall logic of the author's trail philosophy seem irrefutable without being dogmatic. It's a good way to do a book of this sort; after 16 years, it's still the best around.*

•

For some time the trend in the best packs has been toward broad, contoured or ''curvilinear'' belts designed to fit snugly on the hips. But practical difficulties have emerged. The new belts look magnificent. They feel fine too — in the store. Yet I have found, in common with many people, that under a heavy load most of them tend, after a while, to slide downward in a way their contouring is specifically designed to prevent. The result is crampingly uncomfortable. At first I thought the trouble might be in my shape. Everybody's hips and arse are idiosyncratic. (Women, with broader hip design, have the belt advantage, statistically, over us straighter-up-and-down men.) It seems, though, that I am far from alone. And some kind of consensus on the reason is now building.

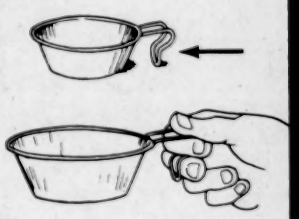
After years of doubt, two fundamental facts of belt design now seem to be generally, though still not universally, accepted. First, a fully encircling belt works better than sidestraps from the base of frame or bag. Second, the essential element in a fully effective encircling belt is a continuous, unbroken base of some semistiff material such as webbing.

The Complete Walker III
Colin Fletcher
1984; 668 pp.
$12.95
postpaid from:
Random House
400 Hahn Road
Westminster, MD 21157
or Whole Earth Access



•

An Illinois reader has made a simple but interesting modification to the Sierra Club cup handle. ''The extra bend,'' he writes, ''affords a secure grip and counterbalance that I have not found in any other cup. If you fill the cup with liquid you will get the full impact of its practicality.'' . . . The bent handle tends to improve the cup's stability . . . on perfectly flat surfaces.



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You may sometimes have difficulty unscrewing your stove's knurled filler cap. Failing pliers, try nylon cord: loop it around the knurled portion and jam (not tie) it tight, then pull. It works, I promise.

•

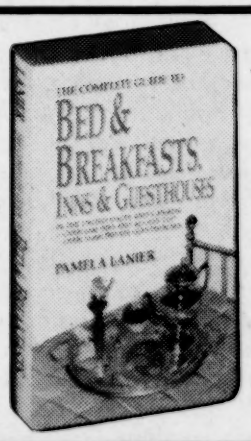
Dental floss.

Acclaimed uses include: ''most everything that nylon cord can be used for plus fishing line''; attaching line guides to fishing rods; binding around-the-neck nylon-cord loop to flashlight that lacks convenient hole; sewing thread; and toothbrush-eliminating dental care.

Bed & Breakfasts, Inns & Guesthouses

***KEVIN KELLY:** Once a rare import found only in rural areas of New England and California, Bed and Breakfasts (B&B) have boomed into the rest of the country. Offspring of a proper British B&B — a small sign hung in the window of a private house — and an American inn, most of these are very small guesthouses. They are far and away the best deal in lodging on the road. A number of listings have attempted to catalog them all, this being the best so far. About 1,200 of them in 50 states and Canada are reviewed.*

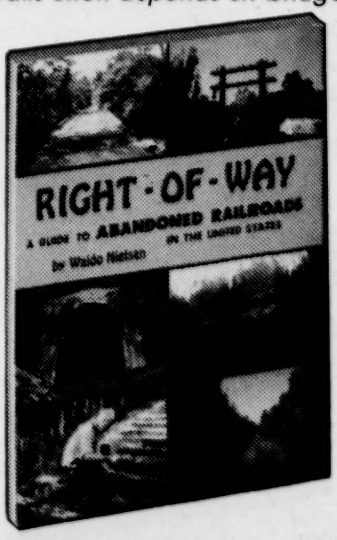
The Complete Guide to Bed & Breakfasts, Inns & Guesthouses
(In the U.S. and Canada)
Pamela Lanier
1984; 352 pp.
$11.45
postpaid from:
John Muir
Publications, Inc.
P.O. Box 613
Santa Fe, NM 87504
or Whole Earth Access

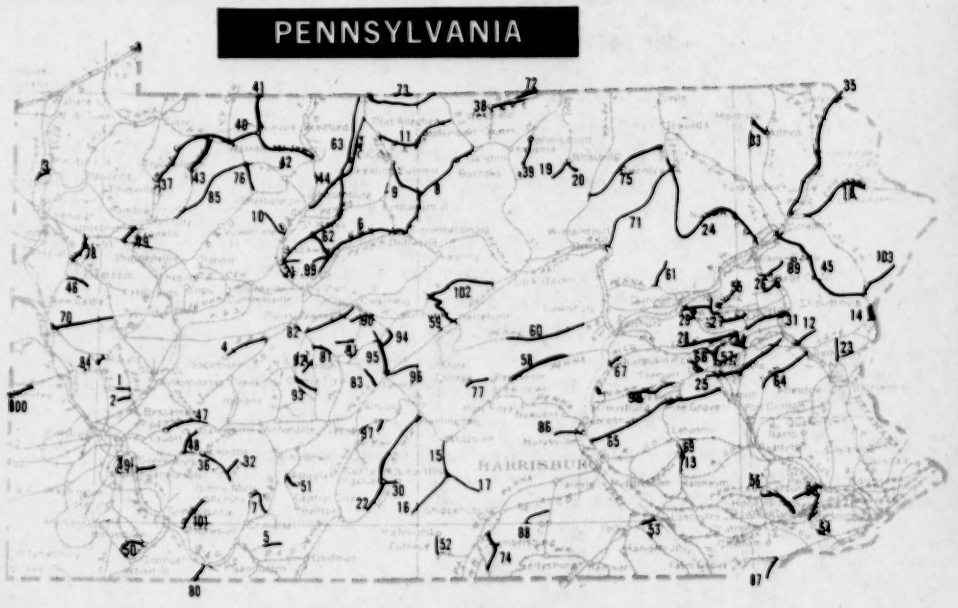


Right-of-Way

***KEVIN KELLY:** The graves of dead railroads are ideal walking paths: scenic, level, extended, and quite forgotten. The routes they follow were often the best walking trails before the railroads took them over. This is an inventory of state maps showing all known abandoned railroads, with year of abandonment. The latter is important since the integrity of these trails often depends on bridges that vanish as they age.*

Right-of-Way
(A Guide to the Abandoned Railroads in the United States)
Waldo Neilsen
1974; 119 pp.
$8.95
postpaid from:
Maverick Publications
Drawer 5007
Bend, OR 97708
or Whole Earth Access



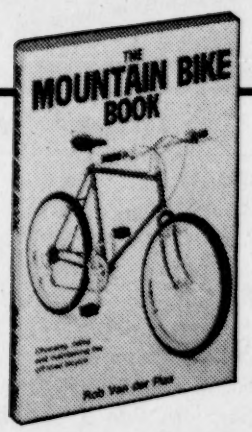


Operating railways in gray, abandoned railways in black.

The Mountain Bike Book

J. BALDWIN: *With most manufacturers and custom builders now doing mountain bikes, how does one tell which one is best? As usual, advertising sizzle doesn't help much, and often gives the impression that you need lots of features that in fact you don't need. Mr. Van der Plas, an old hand at bicycles of all sorts, gives you his experience and rather subjective judgements on how to choose one of the sturdy beasties, how to ride it to best effect, and how to take care of it. I find this generally good information, but you should keep in mind that the field is changing rapidly. Indeed, a mountain bike clone, the city bike, seems likely to take over as the standard bike for everyday use by the less Gonzo among us. (And you can bet there'll be a book on that soon, too.) I'll admit that I use my own mountain bike mostly as a city bike. But mountain or city, the machines aren't cheap. You'll need good advice before you buy. Here's where to get some.*

[Suggested by Jeff Lindsay]



The Mountain Bike Book
Rob Van der Plas
1984; 144 p.
$8.95
postpaid from:
Velo Press, Inc.
P.O. Box 907
New York, NY 10185
or Whole Earth Access

•

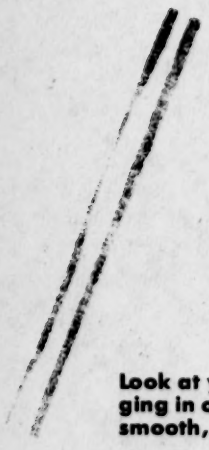
To make a very tight curve . . . the bike must be coaxed to lean quite far in the appropriate direction. Do that by doing what might seem unnatural: first steer the bike very quickly and briefly in the *opposite* direction, and then immediately counter the effect of imbalance thus created by steering sharply the way you want to go.

Hon Folder

J. BALDWIN: *A bicycle in a holster? Well, not quite, but the Hon comes closest yet to being a practical everyday-use machine without the big-wheel bike storage and security problems. That can be important to folks who would use a bike if it could be stashed safely and compactly. The hibernated Hon is a very mere 19"×28"×9" — smaller than my Bickerton Portable (**NWEC**, p. 409). That's small enough to fit under or over your seat on the bus, and you won't have to hassle the driver about regulations against carrying bikes on board because this one carries in an anonymous bag. The Hon unbound has the same seat-pedal-handlebar relationship of a full-size bicycle, though folks needing an extra-large frame size will find the little bike just that: too little. The folding-unfolding procedure is fiddly but fast (15 seconds if you are 50-Fingers Frank), the happy result of some very cleverly designed fittings. On the road, the Hon is stable and a lot less noodly than the Bickerton, though it still takes a bit of practice. It's 4 lbs heavier than the Bickerton's 22 lbs, but it is also made of very sturdy stainless steel instead of the lighter machine's aluminum. I find the added weight to be a bit on the high side for easy handling when folded. Good mountain bikes weigh in that category, so I think it's fair to say that the Hon could use a bit more trimming. The Hon I rode was not assembled well, and was being sold at a hardware store where clerks couldn't make it right. I'd buy one at a "real" bike store where they'll know how to set it up correctly. And I'd buy one too, if I needed the advantages of a folding bike. For portability and just zipping around town, it's the best available.*

Hon Folder
$300-$340
(optional carrying rack & case additional)
Information free from:
Hon Corporation Int'l
1526 W. Winton Ave.
Hayward, CA 94545
415/887-8759

Skiing Right

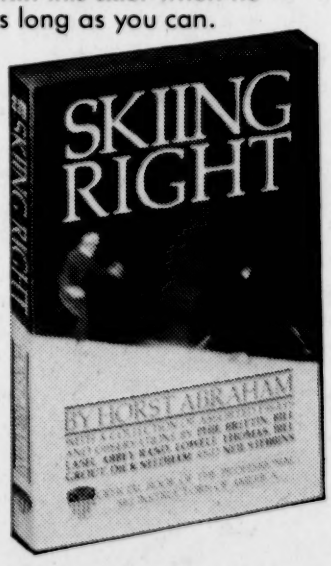


J. BALDWIN: *This is a very unusual ski book. Not so much how-to-ski, but how-to-feel-while skiing. There's a lot in here about body and mind conditioning. There's a lot about how to teach skiing, which isn't too surprising when you consider that this is the "Official Book of the Professional Ski Instructors of America." After being a bit put off by the lack of photos, I found the book getting me into things I'd never even given a glancing thought. That doesn't happen to me very often, so I read it through and learned more than was easy to admit as a know-it-all. If you ski or are thinking you might, I bet you'll find lots of good stuff too. A ski slope directory is included.*

Look at your tracks. Are they telling you that you are digging in one ski but not the other? If this is so, try to leave a smooth, "flat" track behind you.

Play "pushover" with a friend as you stand face-to-face on skis.

• Ski rhythmically to a tune you like that matches your turning.
• Pick a skier who is slightly better than you. Watch him and ski like him.
• Next time, "catch a ride" with this skier when he comes by — Follow him for as long as you can.



Skiing Right
(Official Book of the Professional Ski Instructors of America)
Horst Abraham
1983; 237 pp.
$13.60
postpaid from:
Harper & Row
Keystone Industrial Park
Scranton, PA 18512
or Whole Earth Access

Canoecraft

J. BALDWIN: *Who can resist the gorgeous cover shot? It's enough to ignite the Urge To Build in just about anyone with a heart. All those little parts and pieces are a bit intimidating though, aren't they? But with this exceptionally detailed book, a person of modest means and skills may expect to produce a successful example of one of the seven designs presented. The authors give a well-organized parts list complete with sources, a tool list likewise, and lots of useful information on how to set up your shop space. The construction instruction could scarcely be more clear, and it's done in a tone of explanation rather than order-following, so you'll truly learn as you go. They lead you past the scary parts, never assuming that you already know how to "trim the remaining tips flush with the inner stem." A photo will likely show you exactly what to do, especially where three hands would be a help. This lack of subtle snobbery is rare in boatbuilding books. Altogether an excellent and useful guide to a complex enterprise.*

•

A woodstrip canoe can be built with a bare minimum of tools. One teenager did the entire job with hand tools borrowed from a sympathetic and generous neighbor.

Canoecraft
(A Harrowsmith Illustrated Guide to Fine Woodstrip Construction)
Ted Moores and Marilyn Mohr
1983; 145 pp.
$15.95
postpaid from:
Firefly Books Limited
3520 Pharmacy Avenue
Unit 1-C
Scarborough, Ontario
Canada M1W 2T8
or Whole Earth Access

•

Even buying the most expensive lumber, you should be able to build any of the designs in this book for less than $400 (at 1983 material prices). That is a significant saving, even without considering the priceless personal touches you build into your own boat. As most builders will tell you, their dollar investment was more than repaid long before their canoe took its maiden voyage.

Continue planking up one side only once you have covered the stems, extending the strips over the keel-line.

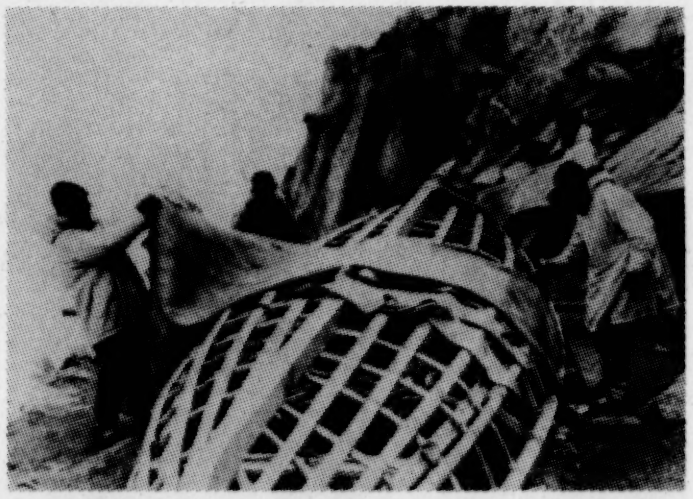
Blue Hole Sunburst

J. BALDWIN: *Our favorite whitewater canoe makers have announced a one-person version called Sunburst. I haven't personally used one yet, but have inspected it closely. It looks very fine in all respects. Users like it a lot. (We still like our much-beaten tandem Blue Hole (**NWEC**, p. 447.) In addition to having the usual virtues of any intelligently designed and craftily built canoe, Blue Hole products have proven themselves able to withstand terrible abuse — much more than other brands utilizing the same Roylex material. That makes their substantial cost easier to take, and bestows a trustworthy reliability on expeditions far from repair shops. I also appreciate Blue Holes because they represent an example of what I call "appropriate high-tech": modern materials and design used in a clever, sensitive way that transcends tradition without sneering. Sometimes I take my old Blue Hole out of its storage place just to look at it and remind myself I should think so clearly as its designers.*

Blue Hole Sunburst
$775
catalog free from:
Blue Hole Canoe Company
Sunbright, TN 37872

The Canoe

J. BALDWIN: *We don't often salute Coffee Table Books of Outlandish Price in these pages, but this one is worth a look if you love that most elegant craft, the canoe. All manner of New World canoes are pictured and described in a text that also serves as a decent period history. Construction details are shown with sufficient detail to permit a clever person a try at making replicas. All this in very large format, impeccably presented. Yum. Have your library order one. Or save up and order one yourself — the romance of all this is hard to resist.*



Arctic boatbuilders apply the ideal covering — split walrus hide.

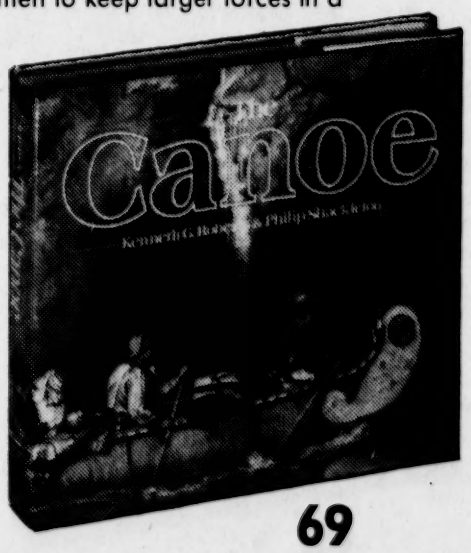
•

The toughest covering for a western Arctic umiak was split walrus hide, which could withstand a buffeting from ice that would grind a European whaleboat to matchwood. Because the frame was lashed together, it too flexed under the pounding of waves or ice pack, and broken ribs or stringers could easily be spliced, or replaced when a new cover was made. A boat of this kind was ideal for whalehunting or for transporting tons of meat back to a winter settlement.

•

Fast bark canoes provided for French forces a mobility in the wilderness that the British never achieved. They could move troops and supplies a thousand miles in a month and this capacity made possible raid and ambush tactics that allowed a few men to keep larger forces in a state of frequent alarm.

The Canoe
(A History of the Craft from Panama to the Arctic)
Kenneth G. Roberts & Philip Shackelton
1983; 283 pp.
$54
postpaid from:
International Marine Publishing Company
21 Elm Street
Camden, ME 04843
or Whole Earth Access



SOFT TECHNOLOGY

Heart Interface Inverter

J. BALDWIN: *An inverter is a device that changes battery-type electricity (DC) into common house-type electricity (AC). Folks with their own power systems often have battery sets for use when their photovoltaic panels, windmill, or water turbine isn't performing. A battery set can be used to power a rather skinny catalog of appliances and lights made for boats and recreational vehicles, or the power can be "inverted" into AC and fed to normal household hardware. Inverters are also used with battery sets and utility electricity where an interruption in commercial power would be intolerable, as in a hospital or with a computer. But inverters have a generally horrible reputation. Mechanical types are very inefficient. Electronic types tend to make lots of "noise" that mars TV pictures, buzzes stereos, and totally freaks out computers. They also waste power just to run themselves. Those that don't waste so much "ask" every few seconds if there has been a demand such as someone turning on a blender. It can be several seconds before the blender commences — disconcerting and possibly unsafe. Worst of all, electronic inverters have a despicable tendency to blow out easily and expensively. You'd think somebody would come up with a better one, and at last, somebody has. The* Heart *uses a tiny amount of power on standby, has minimal noise, is efficient even when lightly loaded, can accommodate varying battery voltages, and is commendably resistant to suicide. Costs lots less than its competition too. My spies tell me that it's everything claimed.*

Heart Interface Inverters
$800 and up
Information from:

Heart Interface Inc.
1626 S. 341st Place
Federal Way, WA 98003

Zomeworks Tide Tank

J. BALDWIN: *Zomeworks, ever clever, has developed a simple device that reduces or eliminates a number of problems and problem parts associated with closed-loop solar water heating systems. The* Tide Tank *replaces the expansion tank, air vent, air purge, check valve (that prevents the heater from futile backwards running at night), and mixing valve — all troublesome and prone to disaster. The* Tide Tank *also prevents overheating of the system when little hot water is being used. This has become common, ironically, with the advent of high-efficiency collectors. Altogether a fine idea typical of this corporation (see* **NWEC** *pp. 190-191). Why, it even acts as a little collector when it isn't working at other duties.*

Tide Tank
$60 - $315
Information from:

Zomeworks Corporation
P.O. Box 25805
Albuquerque, NM 87125

Livos Organic Wood Finishes

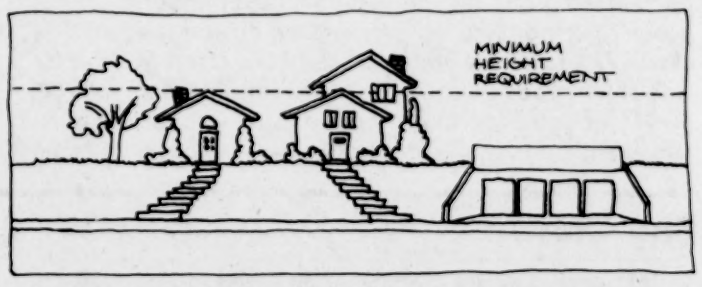
J. BALDWIN: *Wood finishing is one of those places where nasty chemicals and nice people tend to meet intimately. If this has bothered you, a choice is now available. These finishes have no petroleum distillates, lead, or other carcinogenically suspicious substances — they're entirely brewed from plantstuffs. They don't evaporate or otherwise get into your environment even in direct contact. Sounds good to me, though I have not tried any (yet). Obviously it's a fine idea. German-made.*

Livos Organic Wood Finishes
Catalog free from:

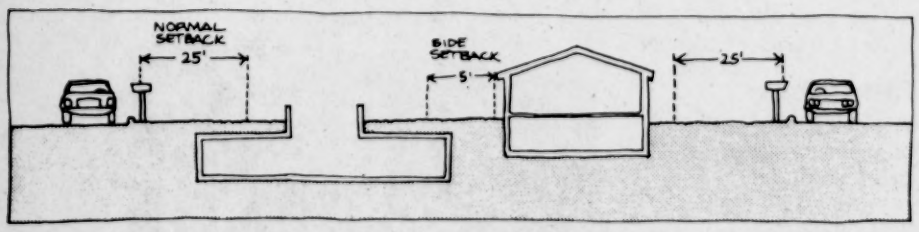
Woodpecker's Tools, Inc.
614 Agua Fria
Santa Fe, NM 87501

The Consumer's Guide to Earth Sheltered Housing

J. BALDWIN: *You can tell when a housing innovation has become acceptably mainstream: banks will lend you the money to build that way. Earth sheltered housing is just about there in more enlightened parts of the country. There have been enough "underground" houses built both well and unsuccessfully to develop an informed experience, with accompanying confidence. Of course, there has to be a book about all this, and here it is. Here are lots of examples, and their histories of financing, code-meeting, zoning, neighborhood friends and foes, ground water problems, builder education, and construction technique. Just what you need to know. A very businesslike workbook format makes the book easy to use as a tool for deciding whether or not to build an earth-sheltered structure, and how to proceed if the answer is yes. It's an unusually competent effort. Longtime undergrounder Malcolm Wells approves too.*



In addition to the potential minimum height zoning violation, this earth sheltered house might be appraised at a lower value because of its incompatibility in size and shape with its neighbors.



The buried parts of the earth sheltered house at left exceed the hypothetical front and side setback allowances indicated; the aboveground portions do not. Whether this design would be acceptable would depend on the zoning officer.

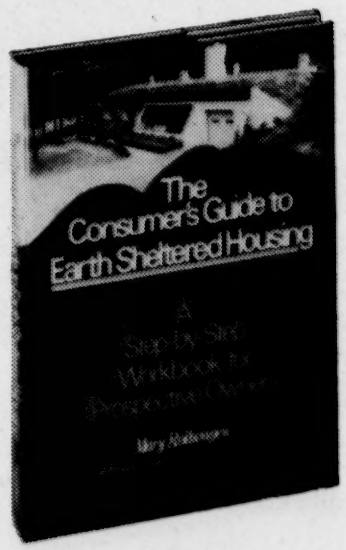
•

If you waterproof your earth sheltered house to meet current model code standards, it will probably leak.

•

The waterproofing process should be observed by the architect, as mistakes here are also common. . . . Since potential waterproofing problems are usually covered quickly in the normal process of construction, it could be months before they are discovered.

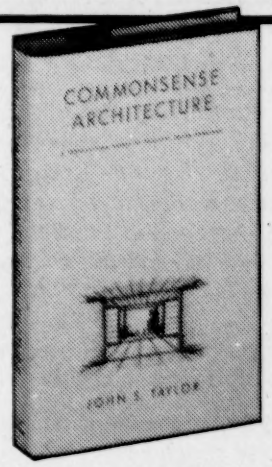
The Consumer's Guide to Earth Sheltered Housing
Mary Rollwagon with
Susan Taylor and
T. Lance Holthusen
1983; 163 pp.
$25.50
postpaid from:
Van Nostrand
Reinhold Co.
Dept. RB
135 W. 50th
New York, NY 10020



Commonsense Architecture

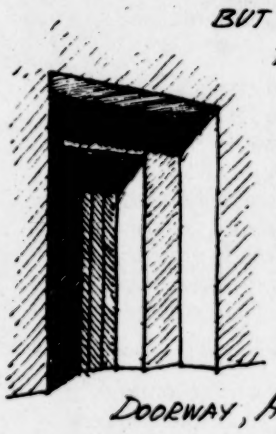
J. BALDWIN: *Hundreds of expert sketches with captions show us how clever folks can be designing their buildings. No text, and it's not missed. Many of the ideas, all taken from real construction, are so smart that you wonder what all the talk these days is concerning energy efficiency and other problems that seem to have been well solved centuries ago. Embarrassing and humbling and a real mind-stirrer.*

Commonsense Architecture
(A Cross-Cultural Survey of Practical Design Principles)
John S. Taylor
1983; 160 pp.
$12.95
postpaid from:
W.W. Norton
Order Dept.
500 5th Ave.
New York, NY 10110
or Whole Earth Access



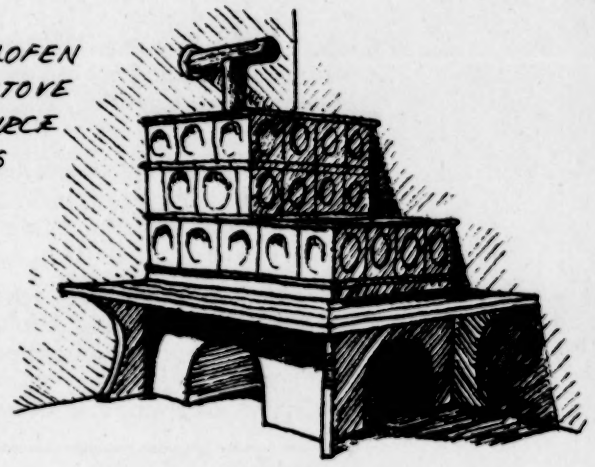
SHADING THE OPENINGS

IN A WARM CLIMATE IT IS IMPORTANT TO DESIGN OPENINGS THAT ADMIT THE COOLING WINDS BUT NOT THE HEAT OF THE SUN. ONE WAY TO DO THIS IS TO RECESS THE WINDOW OR DOOR SO THAT THE DEPTH OF THE WALL SHADES MUCH OF THE OPENING.

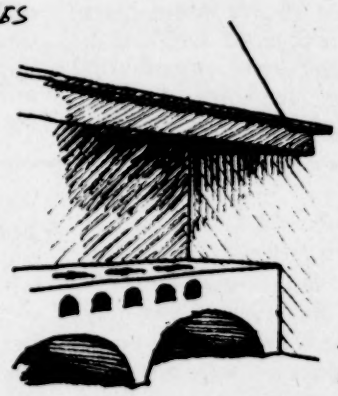


DOORWAY, AFGHANISTAN

THE AUSTRIAN KACHELOFEN DOUBLES AS A COOKSTOVE AND THE MAIN SOURCE OF HEAT. ITS TILES HOLD HEAT FOR LONG PERIODS.



AUSTRIAN KACHELOFEN



A HOOD TO CARRY OFF THE SMOKE WAS A WELCOME ADDITION.

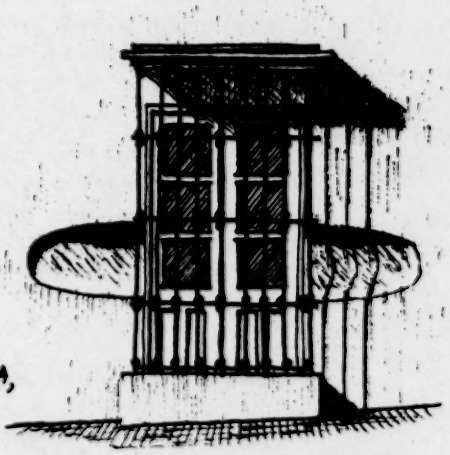
STOVE WITH HOOD, VENEZUELA

SHADING DEVICES SUCH AS ROOFS, SHUTTERS, AWNINGS, LATTICES, AND LOUVERS ARE ALSO EFFECTIVE.

HORIZONTALLY HINGED SHUTTERS DOUBLE AS SHADES.
KAYALLA, GREECE

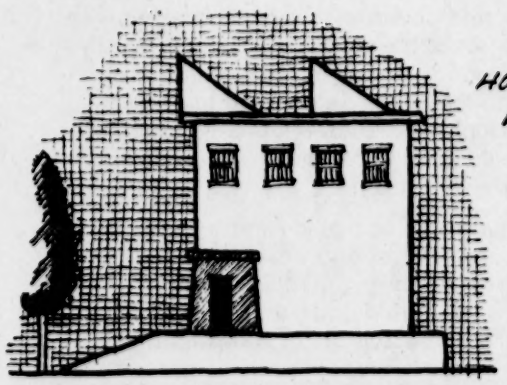
THE SCALLOPED RECESSES IN THIS WALL ALLOW A VIEW TO THE SIDE FOR PEOPLE-WATCHING FROM INSIDE.

ARCOS DE LA FRONTERA, SPAIN



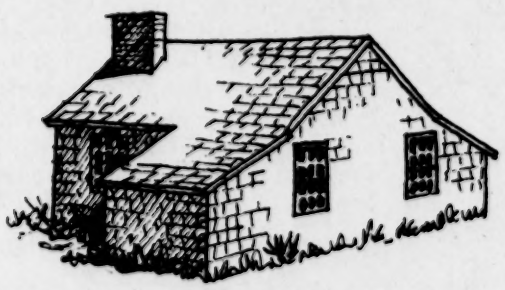
CHANNELING THE WIND

DEVICES THAT COOL HOUSES BY DIRECTING THE WIND INSIDE HAVE BEEN USED FOR CENTURIES.



EGYPTIAN HOUSE WITH WIND SCOOPS
MIDDLE KINGDOM

PERUVIAN WIND SCOOP
(PRE-A.D. 700)



NANTUCKET WHALER'S HOUSE, 18th CENTURY
THE TWO SMALL LEAN-TOS AT EITHER SIDE OF THIS HOUSE WERE ADDED AS EXTRA SLEEPING SPACES.

The Synonym Finder

JOEL RUSS: *Professional writers, students, and others who take writing at least somewhat seriously need a good thesaurus. This one — surprisingly, put out by the best-known publishers of organic gardening and self-sufficiency books — is the most useful I've found. Organized alphabetically like a dictionary, its pages contain many thousands of entries and over 1.5 million words listed as synonyms. The current, revised edition is quite up-to-date, even on slang terms. Rare, archaic, and specialized terms are so labeled in the entries.*

Highly recommended to help you avoid using the same word too repetitively, redundantly, recurrently, incessantly, etc., etc.

•

***whole**, adj.* **1.** entire, full, total, plenary, integral, complete, round, aggregate; comprehensive, universal, inclusive, all-embracing; extensive, extended, widespread; full, filled, pregnant.

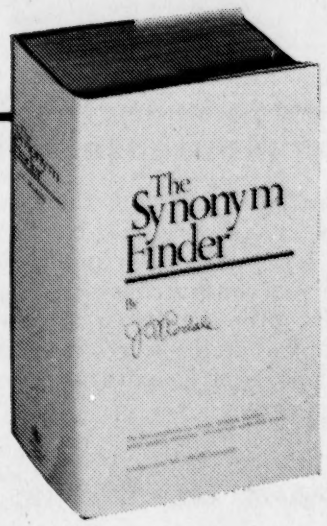
2. solid, unbroken, unsevered, uncut, unshorn, unshortened, unabridged, all in one, unitary; undivided, indiscrete, indivisible, undividable, indiscerptible, inseparable; undiminished, unlessened, unreduced, unabated.

3. sound, indissoluble, intact, hale, hearty, in one piece; healthy, vigorous, robust, strong, recovered, well; unimpaired, undamaged, unharmed, uninjured, unscathed, unmutilated, undecayed, inviolate; pure, unmixed, unmingled, unblended, unalloyed; faultless, flawless, defectless; unblemished, spotless, unspotted, stainless, taintless, untainted, unsullied, unsoiled.

4. self-contained, self-supporting, autonomous, independent; well-rounded, all-sided, fully realized, consummate, enlightened.

5. thorough, thoroughgoing, exhaustive, in-depth, A to Z, *Brit.* A to Zed, *Brit. Dial.* gradely; absolute, dyed-in-the-wool, full-fledged, complete; utter, gross, rank, sheer, radical, sweeping; outright, downright, out-and-out, straight-out, all-out, across-the-board; unqualified, unmodified, uncompromised, unconditional, unconditioned, unreserved, unmitigated; unrestricted, unlimited, unhampered, unimpeded, unbounded; unequivocal, clear, unambiguous, explicit, express.

The Synonym Finder
J. I. Rodale;
revised and updated by
Laurence Urdang
and Nancy LaRoche
1978; 1364 pp.
$19.95
postpaid from:
Rodale Press
Book Division
33 East Minor Street
Emmaus, PA 18049
or Whole Earth Access



Semiotext(e)

JAY KINNEY: *If you like publications that are simultaneously invigorating, infuriating, and groundbreaking, as well as both obscure and obvious, you may like* ***Semiotext(e)****. Originally a little-known semi-academic journal devoted to semiotics — the science of signs,* ***Semiotext(e)*** *has evolved in recent years into the trendiest intellectual journal around. Whether the topic is polysexuality or nonmainstream German politics, a typical issue is likely to have a dense scattershot of translated clippings, interviews, official documents, mini-essays by abstruse French intellectuals, and homely urban photos.*

More than once I've chipped a tooth trying to gnaw on the ideas bandied about in ***Semiotext(e)****, yet the effort is worth the price. Hint: dive into any issue at random — rather like flipping the dial on a TV set — and extract phrases and ideas lying like poetic nuggets amidst the obfuscatory gravel.* *[Suggested by Izzy Kirkland]*

•

During the late fifties and early sixties, a man by the name of Samir Amin taught sociology and political economy at one of the universities in Paris, the Sorbonne, I believe. The professor was a young man, barely thirty years old, born in Cairo, i.e., an Egyptian. His special field was the economy of the so-called developing countries. He had worked for various international organizations and was just named planning consultant to the Sahel country, Mali. Therefore, many stipend holders from the former French colonies were seen in his seminars; Senegalese and Madagascans, Algerians and Somalis, Vietnamese and Moroccans.

On the basis of his theoretical and empirical analyses Amin had concluded that the liberation movements in poor countries could cope with their economic misery only by plowing over, so to speak, the colonial societies which had been deformed by foreign domination. The expulsion of imperialists and the takeover of political power would be of no use if one left untouched the existing social structures. Indeed, one would have to overturn them completely with radical means. In detail, Samir Amin proposed three fundamental interventions:

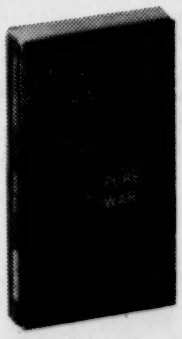
First, the relationship between city and country had to be changed. Urbanization in poor countries would be disastrous: it would have to be reversed by all means. Industrial projects would be postponed; they would only create new dependency on foreign capital. Agriculture deserved absolute preference.

Secondly, the poor countries would have to detach themselves from the world market, where, by its very nature, the capitalist law of the stronger prevails; they would have to put up with a long period of isolation from the rest of the world. Self-sufficiency would have to be the first economic goal. Of course, some deprivation would be the consequence of autarchy in a subsistence level economy, but this would hit mainly the privileged.

Thirdly, it would be necessary to break the cultural influence of the West. The native elite, merchants and civil servants, teachers and physicians, were all infested with values and ideologies of the metropolis. These were the corrupt, parasitic groups posing a constant threat of contamination, and they were determined to prevent any truly independent national development. Therefore, their influence would have to be liquidated, once and for all, and their power broken.

Among the diligent quiet students in Amin's seminar were also some Cambodians; one was named Khieu Samphan, another Jeng Sary, a third Saloth Sar — better known under his *nom de guerre* POL POT. Fifteen years after they all had passed their exam with high honors, these people carried out the advice of their teacher with consistency. Anyone who can read or owns a TV knows about the result; the historians disagree only about whether the experiment of the Khmer Rouge cost the lives of one-half or two-and-one-half million Cambodians. What happened to Samir Amin and what he thinks of his pupils, I do not know.

Semiotext(e)
Sylvere Lotringer and
Jim Fleming, Editors
$12/3 issues from:
Semiotext(e)
522 Philosophy Hall
Columbia University
New York, NY 10027



GOOD MOVIES

by Sheila Benson

PLACES IN THE HEART

PLACES IN THE HEART is writer-director Robert Benton's purest and best movie yet. Its opening and its strong evocation of place makes you remember **A Death in the Family**; both seem to grow from a common impulse and be marked with a common goodness.

Set in Benton's small Texas hometown of Waxahachie, it is a portrait of Americans at a time when they were most sorely tested, mid-Depression 1935. Although the story contains the injustices and upheavals of man and of nature, a lynching, a tornado, adultery, you feel Benton watching these outbursts with a feeling of acceptance encompassed by the film's sublime closing moments. The cast is a tightly-knit unit which includes Sally Field, Lindsay Wagner, Ed Harris, Amy Madigan, and Danny Glover and John Malkovich, two actors from the stage who burst forth in electrifyingly fine style as (respectively) a black sharecropper and a blinded war veteran.

★ ★ ★

In **CHOOSE ME**, a sleek L.A. bar (set firmly in the imagination) and a radio sex-advice talk show link all the characters in a grand romantic arc.

Genevieve Bujold is radio's honey-voiced Dr. Nancy Love. Around her orbit Lesley Ann Warren, owner of Eve's bar, Patrick Bauchau (with whom she has been having a long affair), Rae Dawn Chong, Bauchau's ditzy wife, and Keith Carradine, magnet to all of the women. Ophuls hardly did better with **La Ronde**

CHOOSE ME

than writer-director Alan Rudolph does here.

★ ★ ★

Mozart's music, superbly framed, and the premise of a mediocrity able to perceive genius while knowing the earthbound quality of his own work are among the strongest elements of **AMADEUS**, Milos Forman's film of Peter Schaffer's play. It does not pretend to be a biography of Mozart, but a "fantasia on fact," and in that vein it is sumptuous and bewitching (it is also long, and a touch melodramatic).

Forman has made interesting efforts to make Mozart contemporary, from the style of his wig, which looks very faintly pink and punk, to the situation, in which the already acclaimed Mozart must submit a sample of his work (a scene any actor required to audition will empathize with). Prague, standing in for Vienna, makes a glorious backdrop and both F. Murray Abraham and Tom Hulse are interesting. But Forman's greatest touches are with the music itself, the scenes in which Mozart's music is dissected for us, not dryly but with consummate passion by the envious Salieri, and in the triumphant final 'duet' between Mozart and Salieri as the dying Mozart dictates his Requiem Mass.

★ ★ ★

GARBO TALKS is a real find, a "small" movie with the feeling of a perfect short story, full of superb quick parts (by Harvey Fierstein, Hermione Gingold, Dorothy Loudon) and one bravura big one, by Anne Bancroft. She plays a woman to whom life's daily injustices are a personal challenge, a feisty, funny, great dame whose idol is Garbo. When Bancroft becomes ill her son (Ron Silver) determines to do the impossible and produce the silent Swede. A wry New York fairy tale, tender and hilarious by turns, it was directed by Sidney Lumet from a pungently fine screenplay by Larry Grushin.

★ ★ ★

PARIS, TEXAS, the hauntingly beautiful film which won unanimous first prize at Cannes this year, is by Win Wenders with a screenplay by Sam Shepard and L. M. "Kit" Carson. It is set in Southern California and in a recognizable and at the same time faintly surreal Southwest, where distances stretch on endlessly — almost as far as those between people who love each other. It is a film about those separations and the almost unendurable pull of a ruined love.

Harry Dean Stanton, a tragic romantic at last, plays the ex-husband of Nastassja Kinski, in a shattering performance, and there is a forthrightly good one by Dean Stockwell as Stanton's put-upon brother. It is, very simply, superb. ■

GARBO TALKS

PARIS, TEXAS

WHOLE EARTH SOFTWARE CATALOG VERSION 1.1

STEWART BRAND: *Having presented harsh words about computers in general, we here reveal our true colors with a whole section of largely kind words about computers in particular.*

That's not the only reason it may feel a trifle awkward. The section is trying to serve three functions for three somewhat different audiences:

1) The primary audience is users of the ***Whole Earth Software Catalog*** *who want an update. The* ***Catalog*** *has just been published in its hundreds of thousands, but the research in it dates from last June, and time is cruel to old info in the computer business, even in a slow Autumn like 1984's. We got the idea of frequent updating from software itself, which is constantly coming out in new improved versions — 1.0, 1.1, then 1.2, maybe 1.21 for minor refinements, then 2.0 for a new generation, etc. Convenient numeralclature, hereby borrowed. Next issue:* ***Version 1.2****.*

2) Comprising the second main audience are the 9,000-plus subscribers to the late ***Whole Earth Software Review*** *who are now getting the* ***Whole Earth Review*** *instead and deserve some continuity for the bucks they laid down. Swan singer Art Kleiner (who edited the exceptionally worthy but final* ***Whole Earth Software Review****) here carries on as editor in a format less brightly colored, more condensed, as earnestly researched as ever.*

3) You general readers, who got here because you're faithful ***CoEvolution*** *subscribers, or because you loathe computers and were attracted by the poisonous cover on a newsstand, you are about to overhear a torrent of gossip among true believers speaking in sectarian language. Treat it as a revealing artifact. It may further inform your distrust of computers, or beguile your interest in the sheer usefulness of the things, or amuse you with its intensity. Because the section has no intention of being educational or entertaining, it may well be both.*

For those looking for indications that now might (or might not) be the time to get involved with personal computers, take a look at the coverage of the Radio Shack Model 100 on page 76 and the discussion of the major "integrated" programs, FRAMEWORK and SYMPHONY, on page 87. The first offers a surprisingly cheap whole system, each of the second two offers a lot of functions in one package.

This ***Version 1.1*** *update is organized like the* ***Whole Earth Software Catalog*** *— some general discussion, then the kinds of software arranged by function:*

Playing	**Accounting**	**Programming**
Writing	**Managing**	**Learning**
Analyzing	**Drawing**	**Et Cetera**
Organizing	**Telecommunicating**	

Each of these "domains" has the same domain editor as in the ***Catalog*** *except: Andrea Sharp has replaced Marsha Mather-Thrift on Accounting; Donna Cohen has replaced Rik Jadrnicek on Drawing; Matthew McClure has replaced Gerald Weinberg on Programming.*

In this ***Version 1.1*** *each domain begins with a summary of all the programs recommended in the* ***Whole Earth Software Catalog*** *with a line through the titles no longer recommended, followed by additions to the list since the* ***Catalog****, either in the Fall (and final) issue of* ***Whole Earth Software Review*** *or here before your eyes. We don't recommend lightly. The some 400 programs here are 1/100th of the 40,000 commercial programs said to be on the market.*

Then comes hard gossip — detailed update on changes in the computer market and in our evaluations since June 1984, when the ***Catalog****'s research turned into book. It may seem a bit arcane, even petty, to newcomers, but this is the very lore that people use to make shopping decisions that involve hundreds of dollars each time, about products that they're about to weld to their nervous systems.*

Then, new reviews of new programs — recommendations unless labeled otherwise. Whole Earth has been reviewing do-it-yourself tools for nearly 17 years. Personal computer software is a new genre of tool, combining qualities of a car, a telephone, and a shelf of how-to-books — worthy as ever of close, critical evalution.

Recommended only for specialists

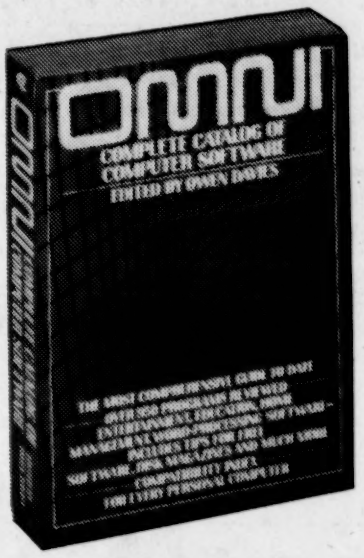
Omni Complete Catalog of Computer Software

ART KLEINER: *This comprehensive book of reviews (471 pages, 950 programs, 23 types of programs) is probably our* ***Software Catalog****'s biggest competitor and we looked ahead to it with trepidation. It turns out that Omni's* ***Catalog*** *doesn't compete with ours much at all; we find it useful in a few specific ways.*

Weaknesses: no pictures ***at all*** *(I don't think we fully realized how important they were to our book until we saw this one). Uninviting format. Unsigned reviews, so you don't know who's speaking. Very little comparative judgment. Very little perspective on the overall usefulness of these tools. And little attempt to make the computer jargon meaningful or even palatable (admittedly frustrating and impossible, but an essential task).*

Strengths: It covers many more utilities than we do, and a few more public domain programs. It covers whole occupational areas which we haven't looked at: Farming. Engineering. Medicine (with one program each for veterinarians and dentists). It critiques weaknesses and judges competently (though never in terms of why you should choose one program over another). Most of this book's readers, I suspect, will be computer-savvy people who want to hunt down a particular feature. It'll be used as a reference book, not a shopper's decision-maker.

Omni Complete Catalog of Computer Software
Owen Davies, editor
1984; 471 pp.
$13.95
postpaid from:
Macmillan Publishing Co.
Front and Brown Streets
Riverside, NJ 08075
or Computer Literacy



MAGAZINES

Recommended in the Whole Earth Software Catalog

Infoworld — *The industry, with glee*
Byte — *Technical authority*
Popular Computing — *Everything for everybody*
Family Computing — *Binding the generations*
Enter — *Kid power*
~~**K-Power**~~ — *For the young obsessive*
Computer Shopper — *The bazaar*
~~**Whole Earth Software Review**~~ — *The shameless*
Time-Life Access — *The establishment steps in*
Newsweek Access — *One-shot sure-shot*
PC Week — *Like whitewater rafting*
PC — *Everything for the IBM PC/compatible*
~~**Softalk**~~ — *The user's voice*
Dr. Dobb's Journal — *The hacker's voice*
MacWorld — *Macintosh essence*
Weekly Marketing Bulletin — *Industry newsletter*
RELease 1.0 — *Wicked fondness for the industry*

RECOMMENDED SINCE JUNE 1984
The User's Guide — *Ongoing series of tutorials*
Computer Book Review — *Good for finding books*

UPDATE

Softalk, we hardly knew ye.

ART KLEINER: *The part of the* ***Software Catalog*** *that most needs updating is the part we expected to change least: our four pages of computer magazine reviews. When software-oriented venture capital slowed down last spring, many companies gutted their previously inflated ad budgets; magazines dependent on those ads are now struggling to survive. Our newsstand consultant David Maisel, a veteran follower of the magazine industry, predicts that by early next year only a dozen consumer computer magazines will remain from the 256 that crowded bookstore shelves in mid-1984. Considering the odds, our recommendations have held up pretty well, but there's one grievous loss: Softalk Publishing, proprietors of* ***Softalk*** *(for Apple computers),* ***Softalk for the IBM Personal Computer****,* ***St.Mac****, and* ***St.Game*** *magazines.* ***Softalk****'s East Coast editor Roe Adams expressed the grief best: "Long a champion of the user,* ***Softalk*** *was a touchstone of reality in a swirling sea of change and rumor. It represented the camaraderie and fellowship which is too rapidly disappearing from the microcomputer industry."*

The sudden collapse was particularly shocking because the magazines were popular — more than 200,000 Apple subscribers, more than 120,000 for the IBM edition. A market survey two months earlier said that an amazing 87 percent of all Apple owners read ***Softalk****.*

So what happened? It started with a foul-up in the accounting department — advertisers weren't billed for three months. By the time the publishers noticed, it was early 1984 — the worst period for the microcomputer software industry in its history. Some of ***Softalk****'s debtors went under; the rest found it hard to pay a sudden three-month advertising bill. By summer, the publishers owed their printer more than $1,000,000. Tragically, the printer's parent, Webb Corporation, insisted on* ***Softalk****'s liquidation, even though that move brought them only a small fraction of the money they would have received if the magazines had survived. Ironically, the publishers had found a bank to loan them the money they owed the printer — but the bank needed collateral, and Webb Corporation had a lien on* ***Softalk****'s collateral which they wouldn't release. The big losers in all this, of course, are* ***Softalk*** *readers. No other magazines fill this niche.*

Also gone is Scholastic's ***K-Power****, a magazine we reviewed for the "young obsessive." I guess not obsessive enough.*

HARDWARE

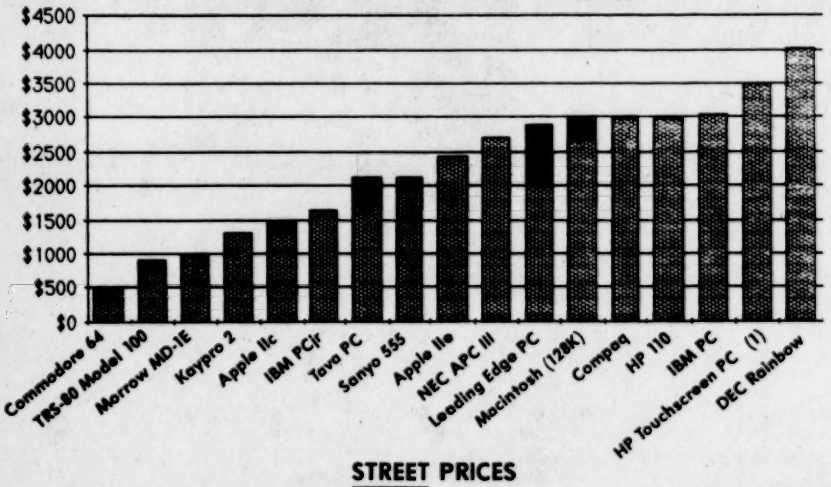
UPDATE

The Summer Price Crash

RICHARD DALTON: *The hardware side of the personal computer business went through some unusually severe perturbations this summer led, not surprisingly, by IBM and Apple. We haven't seen cause to change our basic recommendations, but prices have plummeted as evidenced by our update, this page, of the price list published in the* ***Software Catalog****.*

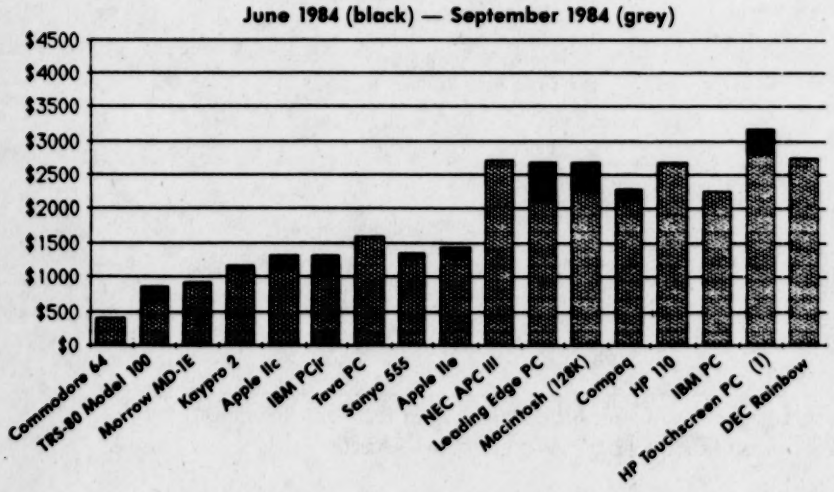
LIST PRICES

June 1984 (black) — September 1984 (grey)



STREET PRICES

June 1984 (black) — September 1984 (grey)



These charts (composed with MICROSOFT CHART, WESC, p. 129) show how much prices for our recommended computers have fallen since we last researched them (June 1984). The list price is established by the manufacturer; street price is typical of what's charged by mail-order firms. The prices include a keyboard, conections for printer and communications, and a monochrome (one-color) monitor.

The computers have varying amounts of working memory: 32K for the Radio Shack Model 100; 64K for Commodore, Kaypro 2, and Morrow MD-1E; 128K for Apple IIc and e, IBM PCjr, and Macintosh; 272K RAM and 392K ROM for HP 110; 256K for everything else. The lap portables (Model 100 and HP 110) include no disk drives; the Commodore 64, Apple IIc, Morrow MD-1E, and PCjr have one each; the rest have two each. For our original chart, with estimated first-year costs for each machine, see WESC, p. 20.

First of "The Great Systems"

The Complete Model 100

ART KLEINER: *Sometimes you can't evaluate a computer separately from its software. The Radio Shack Model 100 is a perfect example. One of the first so-called "lap computers," it's also deservedly the most popular. It's cheap. It's easy to carry around and use. It works reliably (an unusual recommendation for a computer.) It has, built-in, the job most people want from a computer — writing — and the job most people would want if they could get it easily enough — telecommunicating. (Most computers require an external telephone hookup device called a modem, and extra software.) The machine's also got flair built in. Reporters and executives flipped for it, at first because it let them take their work on the road, then because of its human scale at home.*

Now there's justifiable excitement about the deluge of innovative devices and software for the Model 100. This survey presents our choice. It was edited by ***Software Review*** *assistant Editor James Stockford, who gave up his Kaypro II and now relies on the Model 100 exclusively. The other contributors are Woody Liswood, our Analyzing domain editor; Charles Raisch, a portable computer-toting journalist; and Doug Strain, the founder and chairman of Electro Scientific Industries (ESI), manufacturers of laser processing equipment. Note his company's preference: "At ESI we provide it to all our top executives for use on the road, at home, and as a terminal to our DEC 2060 mainframe. Some of us have been using the Model 100 this way for months and find it more efficient than regular micros such as the IBM PC."*

COMPUTER AND PRINTER

Radio Shack TRS-80 Model 100

ART KLEINER: *The basic component of this Great System. We've recommended this several times in our computer publications, most recently in the* ***Software Catalog*** *(p. 16): "Well-designed, it continues to find new uses." You should get the expanded memory (24K) model and even the extra 8K memory module. The extra room for storing text and programs is needed on this tiny computer. Also get Radio Shack's modem cable (number 26-1410) to connect it directly to the telephone network.*

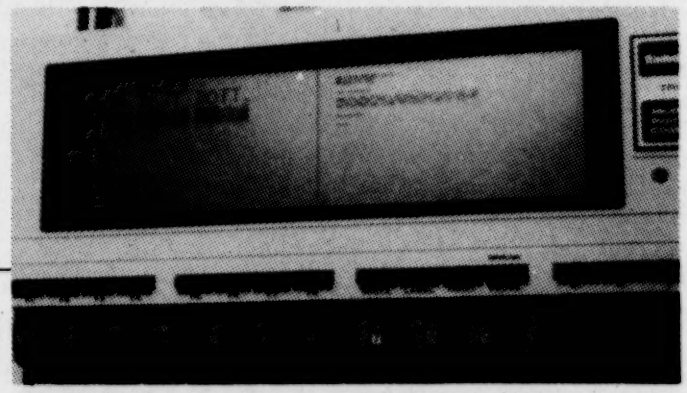
ThinkJet Printer

DOUG STRAIN: *The new Centronics version of the ThinkJet from Hewlett-Packard makes an ideal companion printer. Fast, light, and flexible, it fits nicely with the Model 100 in a shoulder bag with ample room for paper, cables, and so on. Weighs less than 9 lbs.*

SOFTWARE

TEXT POWER 100

DOUG STRAIN: *One of the fastest and most powerful word processors I have used on any computer. The best feature is "Page Plot," which shows your 64-line page on the eight-line Model 100 screen by using one pixel*



DON RYAN

TEXT POWER 100's method of showing a full 64-line page on an 8-line screen. On the left, you use formatting commands to adjust your text's appearance; on the right, the little mock-up "page plot" shows how your printed page will look.

(picture dot) to represent each character. This postage stamp-size page appears on the right-hand side of the screen, reformatting itself instantly whenever you change the formatting commands on the left-hand side of the screen. A great idea, and better than a large CRT, which only shows 25 lines. Note: TEXT POWER 100 only works with parallel printers.

TYPE +

DOUG STRAIN: *Type directly to the paper. TYPE+ makes the Model 100 and any printer into a feature-rich electronic typewriter. Function keys allow text centering, margin sets, right justification, embedded type fonts (bold, italic, etc.), underlining, and backspacing. Advance paper with the ENTER (carriage return) key. Store your typing simultaneously, formatted and edited, in a file as you type. Edit the file, reprint it, or upload it via modem.*

LUCID

WOODY LISWOOD: *As powerful as any spreadsheet for any microcomputer on the market. (Spreadsheets are like automated ledger pages where you set up calculations on rows and columns of numbers.) LUCID comes as a chip you install in the bottom of the Model 100, which means it takes up no memory space, and is fast. The spreadsheet itself is a very large one — 254 rows by 126 columns. LUCID's features include the ability to cut and paste data from one area of the spreadsheet to another, variable column widths, customized input forms, and bug-free formula manipulation. A utility menu branches to specialized extra programs such as sorting and graph drawing.*

Loaded with LUCID, the Model 100 is a serious, portable, spreadsheet tool.

JAMES STOCKFORD: *LUCID ranks right up there with SUPERCALC and 1-2-3. That it can treat text as well as numbers is terrific. Its table lookup feature uses if/then statements to look up figures for particular situations. Create a table for your Nirvana Oil Company. Punch in a bottle size and weight of emollients, and LUCID will come back with the number of bottles you have to sell to make your costs, and warn you if your combination exceeds toxicity levels of boola boola juice or if you'll need so much bacon fat that it will separate out in two months.*

TENKEY +

DOUG STRAIN: *Converts the Model 100 into as many as 120 side-by-side, simultaneous calculators that can do exponents, log functions, common financial functions, and a breakeven analysis.*

DATA+ and SORT2+

JAMES STOCKFORD: *DATA+ is an excellent file manager whose power is equivalent to most good file managers on the Apple II or the Kaypro. Good for a mailing list, electronic rolodex, or taking shelf inventory. Store information on up to sixteen fields on any screen, and use its companion SORT2+ to sort by any field. See our review in the* ***Software Catalog*** *(p. 84).*

T-BASE

JAMES STOCKFORD: *A relational database management system for the Model 100. That should sound crazy, because relational databases, which link separate files for complex interchange of data between them, require lots of memory — a Model 100 weakness. Furthermore, programmers and other computer hipsters will laugh when they read that this program is written in BASIC, which means that it is sloooow. But that also means that the savvy user can modify it.*

The features that put T-BASE ahead of three-by-five cards are its printing and automatic organizing powers. Reports and labels can be quickly created to reflect a wide variety of relationships. Fields in one file can be determined by calculations and relationships in other files. For $100 T-BASE should appeal to Model 100 users who work with small, fairly complex keep-track problems. I know a publisher who keeps track of advertisers with it; a group of friends touring overseas who track their expenses on it, listing travel expenses and meals/lodging separately and totaling them together; and a baseball fan who keeps statistics and player names on T-BASE and links them any way he wants to.

DON RYAN

This Great System is a computer with which you can write, calculate, or telecommunicate, and still take almost anywhere. At bottom right, the basic component — the Radio Shack Model 100. The screen holds 8 lines of text. Clockwise from the computer: the CCR-82 Cassette Player, a good cheap way to record data; the Universal Data Systems 212LP modem, which needs no power cord; the amazing P-drive, a disk drive to take camping; and the best printer we've ever seen, HP's Thinkjet. Not shown: the software and extra chips, and the cables you'd need to connect everything together. Total cost for everything in this article: $3710 (list price).

TELECOMMUNICATIONS

212LP 1200 Baud Modem

DOUG STRAIN: *If you tire of the Model 100's built-in, slow, 300 baud (about 30 characters per second) modem, Univeral Data Systems makes a simple, compact 1200 baud (120 characters per second) unit. It has the advantage that it is powered from the telephone connection, which eliminates the extra power transformer and need to be near an AC power outlet.*

Black Jack (direct modem connector)

CHARLES RAISCH: *So I was the electronic journalist on the scene at the Hyatt, taking notes on the Senator's drunken carousing with a woman who was not his wife, when shots rang out and the famous man slumped forward into his mashed potatoes. After getting back out from under the table, I grabbed my portable computer and modem, and rushed to my hotel suite to file my story, knowing I could get a headline in the evening edition if I hurried.*

I set my gear up on the coffee table, plugged the cable into my modem, and reached for the telephone. Holy Hell! It's an old phone — no modular plug!

The Black Jack hits this problem right on the head. Simply unscrew the mouthpiece of the telephone, drop the round microphone lozenge out of the unit, and screw on the Black Jack. The mouthpiece becomes a modular jack connection needed for direct-connect modems (Ma Bell calls it a female RJ11C connector). You can dial from the computer or from the telephone dial. A neat gadget, and it works with all computers, not just the Model 100. Now I make all the evening editions.

DISK +

JAMES STOCKFORD: *I have used DISK+ to exchange*

files between the IBM PC and the Model 100. The Model 100 controls the whole process, including the disk drive and the file managing activity of the desktop computer. The obvious benefits are easy swapping of files with another computer, and that you can use it to store files and thus avoid the much more tedious cassette recorder storage medium. DISK+ was formerly available on cassette; now it comes as a plug-in chip, which saves memory space. It works with the IBM PC, XT, AT and compatibles; the Apple II family; the Kaypro, the Osborne, and the Epson QX-10; and all TRS-80 machines, from the Model 1 to the Model 2000. (You'll need to buy a null-modem cable to connect between your Model 100 and the other computer.)

TELESTOCK

DOUG STRAIN: *Automatically call up eight stocks of your choice at a designated time. On the left side of the screen are the sales, the prices (high, low, and close), and the change from the previous day. On the right, in graphic form, is the current 45-day history of the stock. Check up to eight stocks on each call to the Dow Jones News Service (**WESC** p. 142).*

TEL-LETR

JAMES STOCKFORD: *This electronic mail service is advertised for Model 100 users exclusively. It works like MCI Mail; you log onto the service and send electronic mail to other members, or send hard-copy mail (printed out by Tel-Letr) to nonmembers. Prices are slightly lower than those of MCI, but that's not the real appeal. This service has features. For hard copy mail, you can specify four colors, boldface, underlining, variable typeface sizes, your own logo printed on both stationery and envelope, your signature, business reply envelopes, and other enclosures. Tel-Letr also offers free business software, nothing fancy, mostly amortization and calculation programs, but they promise to add to the list. You can send and receive Telex messages. They bill you "whenever your account gets up to about $25." This service will soon be available to IBM PC/compatible owners.*

CompuServe Model 100 Special Interest Group

ART KLEINER: *A good place to start telecommunicating. Costs $6 per hour that you're logged in, but you get access to more free software than available anywhere else, and a warmhearted, welcoming community of fanatic Model 100 users. Says Doug Strain: "Extremely useful."*

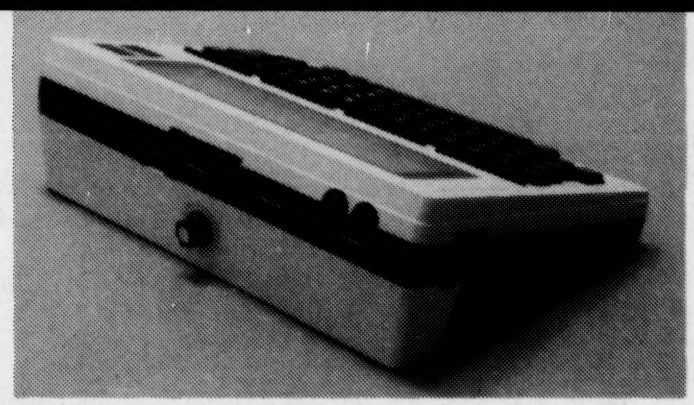
STORAGE DEVICES

RAM Bank

JAMES STOCKFORD: *The most helpful product ever invented for the Model 100. Here's why. The Model 100 is small, its workings are immediately obvious, and it stores multiple files in its working memory (most computers can only keep one file at a time there). These merits spell convenience of a high order. But inherent in the convenience are limits. The problem is always getting around the small memory limits of the machine. The RAM Bank is the best solution yet. It lets you expand your memory an additional 128K. That compares to bolting a 100-gallon gas tank to your car. The RAM Bank screws onto the bottom of the Model 100 and contains nickel cadmium batteries and slots for 16 chips. You can buy programs written on ROM chips, or RAM memory chips for storing your own text and data, in any combination up to sixteen chips total. This is more powerful and cheaper than its competition, the extra memory module from PG Design.*

P-Drive

JAMES STOCKFORD: *A battery-powered disk drive using 3½" disks. It includes its own operating system, P-DOS,*



DON RYAN

That long plastic box plugged into the bottom of the Model 100 is the RAM bank, attached with its own cable (hidden underneath) to the Model 100's built-in extra-memory slot. The RAM Bank extends that slot to 16 more slots, each of which could hold extra memory to store more text, or entire programs like LUCID. How do you choose which slot to work with at the moment? Spin the knob.

to control how you save and retrieve your files. From the main menu select your disk drive, and the drive will produce a second menu of your choices of disk files. Create directories and sub-directories of files. Take it with you when you go camping.

CCR-82 Cassette Player

DOUG STRAIN: *A new compact data recorder from Radio Shack. Switch the recording monitoring sound on or off. Switch the computer control of the motor on or off, for manual control. Switch a volume control position to set the machine for an optimum recording level. A great improvement over the bulky old CCR-81 Radio Shack data recorder, and the price is right.*

JAMES STOCKFORD: *I like it because it's so little. It runs on four AA cells or a 6-volt adaptor cord. Definitely the first choice cassette recorder. By the way, when you buy cassettes, get the C-20 Deluxe cassettes rather than the C-20s. They are much more reliable.*

Radio Shack Bar Code Reader

DOUG STRAIN: *Radio Shack now sells a bar code reader. Enter bar coded programs appearing in some computer magazines just by passing the reader over the page, or enter bar coded inventory items into a DATA+ file.*

MORE INFORMATION

Portable 100 Magazine

DOUG STRAIN: *The source of much of my information. Nothing like third-party manufacturers and reporters to move the state of the art along!*

GREAT SYSTEMS ACCESS

TRS-80 Model 100 ($800, 24K), **8K Ram module** ($120), **Bar Code Reader** ($100), **Modem Cable #26-1410** ($20), **CCR-82 Cassette Player** ($50), **C-20 Deluxe cassettes** ($3.79 ea): Radio Shack, 1700 One Tandy Center, Fort Worth, TX 76102; 817/390-3700 • **ThinkJet Printer** ($500): Hewlett-Packard, 1020 N.E. Circle Blvd., Corvallis, OR 97330; 800/367-4772 • **TEXT POWER 100** ($50): The Covington Group, 310 Riverside Dr., Suite 916, New York, NY 10025; 212/678-0064 • **TYPE+** ($70), **LUCID** ($150), **TENKY+** ($60), **DATA+** ($60), **SORT2+** ($30), **DISK+** ($70), **RAM Bank** ($120), **P-Drive** ($600): Portable Computer Support Group, 11035 Harry Hines Blvd., #207, Dallas, TX 75229; 214/351-0564 • **T-BASE** ($100): Travelling Software, Inc., 11050 Fifth Ave. NE, Seattle, WA 98125; 800/343-8080 • **212LP Modem** ($345): Universal Data Systems, 5000 Bradford Dr., Huntsville, AL 35805; 205/837-8100 • **Black Jack** ($50): Microperipheral Corp., 2565 152nd Ave. NE, Redmond, WA 98025; 206/881-7544 • **TELESTOCK** ($60): Skyline Marketing Corp., 4510 W. Irving Park Rd., Chicago, IL 60641; 312/286-0762 • **TEL-LETR**: Gunther International, Ltd., P.O. Box 586, Mystic, CT 06355; 203/536-4926 • **CompuServe Model 100 Special Interest Group**: CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, OH 43220; 800/848-8990, or (in Ohio) 614/457-8650 • **PG Design 32K RAM Bank** ($325): PG Design Electronics, Inc., 66040 Gratiot, Richmond, MI 48062; 313/727-2744.

Portable 100 Magazine, $29.97/12 issues, from Portable 100 Magazine, P.O. Box 250, Camden, ME 04843; 800/225-5800.

PLAYING

Recommended in the Whole Earth Software Catalog

STRATEGY
ARCHON —
Dungeons and Dragons meets chess
~~ALICE~~ — *Mad Hatter chess*
LIFE — *Deceptively simple, infinitely deep*
MEGAWARS — *Shooting spaceships via modem*
OLD IRONSIDES —
Battle of the micro ships, quick
BROADSIDES —
Battle of the micro ships, long
KNIGHTS OF THE DESERT —
Extended campaigns for PC
OPERATION WHIRLWIND —
Exercises in strategy
ROBOTWAR — *Teaching your computer to fight*
FORTRESS — *Classic for tournaments*
FLIGHT SIMULATOR — *The pilot's point of view*
M.U.L.E. — *Colonizing new worlds, future*
THE SEVEN CITIES OF GOLD —
Colonizing new worlds, past
THREE MILE ISLAND and SCRAM —
Run your own nuke plant

ACTION
POLE POSITION — *A play at the races*
PITSTOP — *Controlled panic changing tires*
CHOPLIFTER —
The classic helicopter hostage rescue
~~VYPER~~ — *Blowing minds on the Mindset*
PINBALL CONSTRUCTION SET —
A universe of bumpers, flippers, and rollovers
CROSSFIRE — *An addicting, quiet massacre*
DRELBS — *Cartoon capers on the atomic grid flip*
BOULDER DASH —
Freeing the butterflies on 16 levels
MOONDUST —
Finally — a game you can chant to
LODE RUNNER — *150 craaa-zzy screens*
BLUE MAX — *The definitive WWI ace game*
REPTON — *Elaborate Defender*
OIL'S WELL — *Attacking with Roto-Rooters*
MINER 2049ER — *Obsessive mazes*

SPORTS AND NONCOMPUTER GAMES
MONTY PLAYS SCRABBLE —
Word maniac's delight
COMPUTER BASEBALL —
Replaying the World Series
STAR LEAGUE BASEBALL —
Encouraging quick reflexes
JULIUS IRVING AND LARRY BIRD
GO ONE-ON-ONE —
Slam-dunkin' realism, playground pyrotechnics
PRO-GOLF CHALLENGE —
In golf, the swing's the thing
SARGON III —
Rediscovering chess with the computer

ADVENTURE
ADVENTURE — *The first Adventure lives!*
THE QUEST — *Bright graphics, punchy parser*
ZORK I, II, and III — *Classiest adventure*
PLANETFALL — *Venturing with a sidekick*
DEADLINE — *Whodunit in real time*
TIME ZONE — *First microcomputer epic*
WIZARD AND THE PRINCESS —
Best initiation into adventure world
EAMON — *Adventuring in the public domain*
WIZARDRY —
Dungeons and dragons brilliantly realized
ULTIMA II — *Role-playing quest marked by challenge and whimsy*
EXODUS: ULTIMA III —
Challenging mystery for fanatics
WIZARD'S CASTLE —
A CPM gem captured by modem

RECOMMENDED SINCE JUNE 1984
BC's QUEST FOR TIRES —
The first funny computer game
QIX — *Your only offense is defense*
PITS AND STONES — *Pit yourself against Pitman*
HEROISM IN THE MODERN AGE —
A game that lets you be yourself
THE ARCADE MACHINE —
Shoot-'em-up construction tool
EXECUTIVE SUITE —
Playing out company politics

RECOMMENDED HERE
SUNDOG
RUN FOR THE MONEY
POGO JOE

UPDATE

A rash of McGames

STEVEN LEVY: *The software slowdown has hit entertainment programs the hardest. As a result, the number of games released in the months before Christmas 1984 isn't nearly as prodigious, or presitigious, as that of previous autumns.*

Still, the Playing domain has its share of changes since those olden days of Spring 1984. Sadly, the most highly recommended magazine, ***St.Game****, has seen the "Game Over" screen even before its companion magazines,* ***Apple*** *and* ***IBM Softalk****, went the way of the buffalo and the Osborne I. Another frustration is Apple's postponing the release of the ALICE game, which I reviewed in a fairly final pre-release form, having been assured it would be available long before the* ***Whole Earth Software Catalog*** *hit the stands. Same problem with Synapse Software's VYPER, which will run — we hope hope — on the Mindset computer.*

Everyone is wondering about Atari. It produced a boring game based on the ***Gremlins*** *flick but, in conjunction with Lucasfilms, it announced some stunning new games that eventually will run on the gamut of machines. Best among them was BALLBLAZERS, kind of an intergalactic two-player soccer match. But Atari's tight lips about its future cast doubt on the future of the potentially brilliant Lucasfilms collaboration.*

But on other fronts, good news. Since my review of the profoundly deep LIFE simulation, a speedy new Macintosh version has appeared — its implementor, Apple Fellow Bill Atkinson, has graciously placed it in the Public Domain, and the program is now widely circulated. (It is among the free progams in databases stored in the Micro Apple Users Group on the CompuServe system.)

Some of the games reviewed are newly sequeled — ARCHON, for instance, has spawned ADEPT: ARCHON II, which is easier to get into than the original, and to my mind an even better game. LODE RUNNER has spawned CHAMPIONSHIP LODE RUNNER, fifty new screens so tough that its publisher, Broderbund, sells an optional hint book. Roberta Williams of Sierra On-Line has topped herself with a new Hi-Res Adventure that allows you to move the character around as if you were in control of a cartoon character: the fairy-tale-like KING'S QUEST is available from Sierra on IBM-PC, and from IBM itself on the PCjr (sharper graphics). Infocom has added to its short but high-quality list of adventure games with SEASTALKER, notable for its low entry level and its accessible hints.

*The latest adventure trend, though, is to enlist "real" authors to help design the games. The Spinnaker company's Trillium offshoot has an author list that sounds like the science fiction hall of fame. Its first offering, AMAZON, by Michael (****Terminal Man****) Crichton, is top-shelf.*

Meanwhile, a rash of Macintosh games. Often, porting an old game to the Mac makes it new again. In the case of Blue Chip Software's MILLIONAIRE, it makes it much easier to use, and extremely addictive. Penguin Software's PENSATE game becomes even more bewitching. Still to come: spiffy Mac translations of PINBALL CONSTRUCTION SET, WIZARDRY, and ULTIMA III.

ART KLEINER: *Note: I spent two evenings with Roberta Williams' KING'S QUEST. While the animation is diverting (the little knight runs, jumps, ducks, and climbs), the game's storyline is simple-minded and devoid of humor. I stuck with it through the first third of the quest, then realized I felt bored. A good technical step, but a dull adventure.*

PLAYING ACCESS

ALICE (price not set yet): Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 800/538-9696 • **VYPER** ($50): Synapse Software, 5221 Central Ave., Richmond, CA 94804; 415/527-7751 • **ADEPT: ARCHON II** ($40): Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403; 415/571-7171 • **CHAMPIONSHIP LODE RUNNER** ($35): Broderbund Software, 17 Paul Drive, San Rafael, CA 94903; 415/479-1170 • **KING'S QUEST** ($50): Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614; 209/683-6858 • **SEASTALKER** ($40–$50): Infocom, Creative Fulfillment, 40 Daniel Street, Farmingdale, NY 11735; 800/262-6868 • **AMAZON** ($33–$40): Spinnaker Software Corp., 1 Kendall Square, Cambridge, MA 02141; 617/494-1200 • **MILLIONAIRE** ($60): Blue Chip Software, 6744 Eton Avenue, Canoga Park, CA 91303; 818/346-0730 • **PENSATE** ($40): Penguin Software, 830 4th Avenue, P.O. Box 311, Geneva, IL 60134; 312/232-1984.

Capitalists from outer space

SUNDOG

Bruce Webster and Wayne Holder. Version 2.0. Copy-protected. $40. For Apple II family. FTL Games Inc., 7907 Ostrow Street, Suite F, San Diego, CA 92111; 619/279-5711.

RUN FOR THE MONEY

Tom Snyder Productions. Copy-protected. $40-$50. For Atari; Apple II family/Macintosh; Commodore 64; IBM PC/XT. Scarborough Systems, Inc., 25 North Broadway, Tarrytown, NY 10591; 914/332-4545.

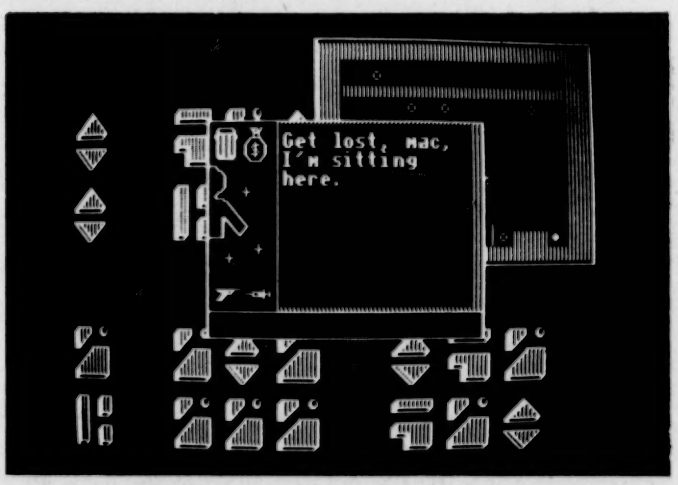
STEVEN LEVY: *Two extremely different games I've been enjoying lately have the same theme: an interplanetary adventure which requires the player to reach his or her quest by going into business. Fortunately, neither game is in the least oppressive about the process, and both are utterly fascinating in creating little worlds in and of themselves.*

SUNDOG is a role-playing game — one in which you create your own character — with a twist. It's totally controlled by joystick. For each choice you make, you open little windows — à la the Lisa computer — which give you options for, for example, defining your character's attributes. And you'd better choose wisely, because as the inheritor of your uncle's aging trader spaceship you will be going from planet to planet in order to buy goods at auctions and sell them in some other galaxy at a profit. Winning the game requires paying off the debts you're saddled with in the beginning and vindicating the family name. It not only sounds like a movie, it plays like one. At all times, you actually see your character (or a dot that represents him) moving through the spaceship, or the towns he visits on various planets, or through space itself (navigated through cleverly conceived star-map windows). In one case, you leave the spaceship, guide your character through a town, enter a bar, and ask the bartender where someone can buy a gun. The barkeep directs you to a booth and while you're waiting you see one of the customers drift over to the booth. Then the customer asks you what you might want to pay for this gun. Fascinating.

SUNDOG is one of those hours-and-hours games that can make your nights late ones for weeks.

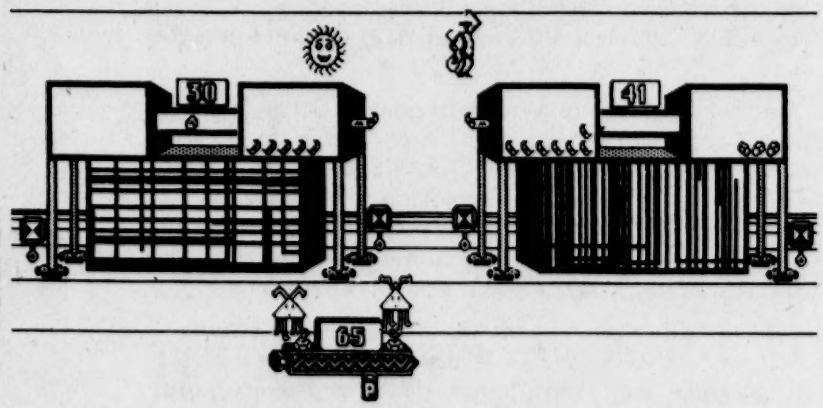
RUN FOR THE MONEY, on the other hand, works only as a two-player game, and is less an evolving narrative than a heads-on competition. The packaging seems to emphasize the educational aspect — there's even a Ph.D. credited for the program's "economics design." But in the hands of master software artist Tom Snyder this is much too much fun to be labeled educational. The plot sounds more complicated — and sillier — than the game really plays. You're a creature called a Bizling, forced down on Planet Simian. To buy the tools and materials to repair your ship, you must make money, which you do by manufacturing artificial bananas for the monkey-like inhabitants of the planet. Meanwhile your opponent tries the same thing, and the first one who gets the ship off the planet wins.

Unlike a run-of-the-mill strategy game, this is all done with crisp animation — you don't read what happens, you see what happens. The controls, with each player using one side of the keyboard, are easy to master, and the strategy soon becomes Byzantine, but always according to established economic principles. There's a spreadsheet-style planning mode where you make the next week's budget (what quality raw materials? how much should you advertise?). And there are tension points throughout that make previously arcane business tactics natural strategic moves within the context of the game. After a few heated competitions, I can vouch that this game is balanced so that people play against each other, instead of sitting back and letting the computer run the show. Added delight: when you boot the game, the song that plays is the R&B classic "Money (That's What I Want)." Indicative of the attention to detail throughout.



ART KLEINER

I piloted my SUNDOG ship to the planet Glory I and wandered through its spaceport. Eventually I came to a bar that sold "food, drink, or information." SUNDOG's universe contains dozens of other planets; you'll need to visit many of them to fulfill your quest.



STEVEN LEVY

A typical RUN FOR THE MONEY struggle, with triangular "Bizlings" bidding for paint for the shields of their spaceships (those two large structures behind them). You can see in the center that the price is up to 65 units.

A nice balance between challenge and reassurance

POGO JOE

Copy-protected. $25. For Atari; Commodore 64. Screenplay, P.O. Box 566, Minden, NV 89423; 702/782-9731

ART KLEINER: *Too few computer games make allowances for wimps. The honeycomb hopping-fields of Parker Brother's Q*BERT, for instance, are appealing; but I can't keep the game's flute-nosed hero from diving off the edge of the playing field to his death. I don't have the*

patience to build up my joystick skill just to see what happens next in the game. But I do find satisfaction in hopping a character through a series of checkerboard environments, avoiding poisonous creatures, jumping across traps, and seeing what's new in each successive screenful of pitfalls. That's why I go for POGO JOE.

As Pogo Joe, you're a grinning goon on a bouncing pogo stick in a world of brightly colored pylons. You must touch each pylon before going on to the next screen. There are orange elephants and macabre blue gargoyles to jump on; vicious green ducks, druid-like moose, and dessicated-looking snakes to avoid; plus spinning red tops that undo your work and force you to return to pylons you've already touched — and (no doubt) into the path of a druid-moose. Tunnels bounce you straightaway across the screen, green squares knock all other creatures temporarily off the board, and time-bomb pylons explode at precisely the right moment. The programmers' creatively demented personalities emerge in the game's bright and witty look, and in the titles for each new screen: "Ode to Zippy," "Terror Lunch," "Requiem for a Hosehead," and ultimately, "Aieee!"

We wimps can set speeds so that Joe vibrates like a cocktail shaker, while his opponents trudge along in slow, deliberate hops. (Or, if you're not a wimp, you can set them at identical speeds.) You can start at any screen you like, and take a tour of all 64 screens before starting the game. Best of all, you can't fall off the edge! Joe just hops in place until your hand figures out the joystick motions and your brain appreciates the inventiveness and humor that follows.

(See back cover for a look at one screen in the POGO JOE universe.)

WRITING

Recommended in the Whole Earth Software Catalog

COMMODORE 64
HOMEWORD —
Icons make it easy to learn and remember
OMNIWRITER — *Best on the Commodore*
TYPING TUTOR III — *Fixing the major source of word processing errors*

ATARI 800 XL
HOMEWORD —
Icons make it easy to learn and remember
ATARIWRITER — *Best on Atari*

APPLE IIe, IIc
HOMEWORD —
Icons make it easy to learn and remember
PFS:WRITE — *Clean*
WORD JUGGLER —
Best on the Apple IIe and IIc
SENSIBLE SPELLER —
Good but only works on HOMEWORD
TYPING TUTOR III — *Fixing the major source of word processing errors*

CP/M-80
WORDSTAR —
The old standard, now controversial
NEWWORD — *Better, cheaper*
PERFECT WRITER — *Strongest editing on CP/M*
PLU*PERFECT —
Enhancement for PERFECT WRITER
THE WORD PLUS — *Ubiquitous speller*
PUNCTUATION + STYLE —
Monitors common punctuation mistakes
COMPARE II — *Tracks editing changes*

RADIO SHACK 100
SCRIPSIT 100 — *Write anywhere, even print*

MACINTOSH
MACWRITE —
A revolution in word processing graphics
~~MICROSOFT WORD~~ —
Could be the new standard

IBM PC COMPATIBLES
HOMEWORD —
Icons make it easy to learn and remember
PFS:WRITE — *Clean*
~~WORDVISION~~ — *Creative*
VOLKSWRITER DELUXE —
The most elegant middleweight
PC-WRITE — *Born free*
WORDSTAR —
The old standard, now controversial
NEWWORD — *Better, cheaper*
WORDPERFECT —
Clean and powerful middleweight
XYWRITE II+ — *Harsh, fast*
MICROSOFT WORD (with mouse) —
Could be the new standard
WORD PROOF —
Best for spelling and synonyms
CORRECTSTAR — *Phonetic spelling aid*
THE WORD PLUS — *Ubiquitous speller*
PUNCTUATION + STYLE —
Monitors common punctuation mistakes
COMPARE II — *Tracks editing changes*
TYPING TUTOR III — *Fixing the major source of word processing errors*

RECOMMENDED HERE: (p. 76-77)
TEXT POWER 100
TUTOR +
TYPE +

UPDATE

Three Availability Problems

STEWART BRAND: *Only three changes to report this time in the recommended list, concerning MICROSOFT WORD for the Macintosh, WORDVISION for the IBM PC/compatibles, and OMNIWRITER for the Commodore 64 . . .*

While MICROSOFT WORD on the IBM/compatible machines continues outstanding (it's my writing program of choice), it still is not available on the Macintosh and can't be recommended until it is. Speaking of Macintosh, now that 512K Macs are available with four times the memory of the original 128K Macs (and costing $3,000 versus $2,000) I see no reason to recommend the 128K Mac at all, especially for word processing. It is intolerably slow, constantly interrupting to hum to itself and putter around finding something on disk. Great word processing programs are promised, both from Apple and from Microsoft. One or both of them on a 512K Mac may be marvelous. We'll see.

I'm dropping clever WORDVISION from the recommended list because it has become a forlorn thing in the market. It has no spelling or style checker to support it and never will, it doesn't telecommunicate well, and it doesn't blend happily with other programs. One of the originators, Bruce (of Bruce & James), is busy suing his partner and everything else that moves. The distributor Simon & Schuster is sick of the product. What kept it from developing the support of other programs, later versions, books, etc.? It came out a year later than promised and "missed the window," as they say. Hit the wall instead.

OMNIWRITER, the best full-featured word processor on the Commodore 64, is having similar problems. Publishers HES (Human Engineered Software) is in Chapter 11: formal deep trouble. I hope someone else picks up this valuable program. Even if they don't, since OMNIWRITER includes a pretty good spelling checker for its quite reasonable $60, I still recommend getting it. You might find it at substantial discount.

WRITING ACCESS

MICROSOFT WORD ($375, with mouse $475): Microsoft Corp., 10700 Northup Way, Box 97200, Bellevue, WA 98008; 206/828-8080 • **WORDVISION** ($80): Bruce & James Program Publishers, Inc., 2355 Leavenworth, Suite 103, San Francisco, CA 94133; 415/775-8400 • **OMNIWRITER** ($60): HES, 150 North Hill Dr., Brisbane, CA 94005; 415/468-4111.

ANALYZING

Recommended in the Whole Earth Software Catalog

SPREADSHEETS
1-2-3 — *Lots of rows, the premium multi-function package*
SIDEWAYS — *Prints extremely wide spreadsheets*
SUPERCALC, 2, 3 — *Great graphics*
MULTIPLAN — *Best at consolidating worksheets*
VISICALC, IV — *The original*
MERGECALC — *Combining VISICALC worksheets*
LOADCALC — *Moving text into VISICALC*
MAGICALC or THE SPREADSHEET or IACCALC — *For the Apple II family*
~~WORKSLATE~~ — *A portable spreadsheet machine*
TKISOLVER — *Complex problem solving*
CALCSTAR — *Statistical functions and WORDSTAR compatibility*
MINIVC — *Free for Model 100 owners*

STATISTICS
DAISY PROFESSIONAL — *Best value for Apple II owners*
ABSTAT — *Accepts data from many sources*
STATISTICAL CURVE FITTING — *For lap computers*
CURVE FITTER — *Professional, technical graphics*
SCIENTIFIC PLOTTER — *Speedy graph maker*
REGRESSION ANALYSIS — *The price is right — free*

THE STOCK MARKET
VALUE/SCREEN — *Fundamentals, for investors*
WINNING ON WALL STREET — *Technical, for traders*

RECOMMENDED HERE: (p. 77-78)
LUCID
TELESTOCK
TENKY+

UPDATE

Cheapest may be best

WOODY LISWOOD: *Keeping track of things in the last three months was easier than usual. SYMPHONY, the spreadsheet-word processor-graphics-data manager-telecommunications program, is obviously the best spreadsheet now available for microcomputers, except for a fatal flaw which will keep me from using or recommending it. The problem is size. SYMPHONY, because it needs room in memory for its word processor, data manager, and graphics, only makes about half the working space available for spreadsheets as 1-2-3 does. That means more than half of my large spreadsheet models will not load into SYMPHONY on my 640K Compaq. Too bad. (For more on SYMPHONY, see page 87.)*

On the other hand, we received a demo disk of a new spreadsheet called PRACTICALC III, from Practicorp International. This nifty MS-DOS program costs $100. It appears to have all of the features of LOTUS 1-2-3 with better memory management and reasonable graphics. It goes to 9,000+ rows and 255 columns. If the working disk lives up to the promise of the demo disk, PRACTICALC III should become a best-buy recommendation. The other exciting spreadsheet program comes on its own chip — LUCID, for the Radio Shack Model 100. (See "The Complete Model 100," page 76.)

I have always thought that only one in a thousand folks knows what statistics programs are used for in the working world — drawing inferences about groups of numbers. For instance, if you poll two separate groups of people, a statistics program will reveal the mathematical relationships between your two different sets of survey results. Even among people who know the purpose of statistics programs, only one in a thousand might actually purchase one. Nevertheless, there are lots of new statistics programs on the market.

Our Apple statistics recommendation, DAISY PROFESSIONAL, has been delayed in its conversion to the IBM PC and compatible computers. But there are new complex statistical packages for the PC, worth waiting for before you decide. CRISP has received good reports. It is a massive multi-disk program which occupies megabytes on a hard disk. The manual has 31 chapters. The program seems to do everything from cross tabs to stepwise multiple regression; pick your favorite statistical test and it is probably there. Only 252 variables are allowed, which should be enough for most needs. CRISP is menu-driven and mostly self-prompted. I will hold a full recommendation back until I can test all the functions and compare it to SPSS, one of the most popular (and best) mainframe statistical programs, just announced as forthcoming for the IBM PC world.

STEWART BRAND: *WORKSLATE, Woody Liswood's beloved $1200 portable spreadsheet machine, failed in the marketplace and has been discontinued by Convergent Technologies.*

ANALYZING ACCESS

PRACTICALC III ($100): Practicorp International, Inc., 44 Oak Street, Newton Upper Falls, MA 02164; 617/965-9870 • **DAISY PROFESSIONAL** ($200): Rainbow Computing, Inc., 8811 Amigo Ave., Northridge, CA 91324; 818/349-0300 • **CRISP** ($500): Crunch Software, 2547 22nd Avenue, San Francisco, CA 94116; 415/564-7337 • **SPSS** ($800): SPSS, Inc., Suite 3000, 444 N. Michigan Avenue, Chicago, IL 60611; 312/329-2400.

ORGANIZING

Recommended in the Whole Earth Software Catalog

LITTLE BOXES
PFS: FILE — *Good for beginners, maybe all you need*
PFS:REPORT — *For convenience and calculations*
PFS:SOLUTIONS — *Easier yet*
OFFIX — *Everything happens right before your eyes*
PC-FILE III — *Count the features, divide by the cost (free)*

OTHER FILE MANAGERS
PERSONAL CARD FILE — *Touch and roll*
DB MASTER — *For files spread over several disks*
VERSAFORM — *Best at producing forms and reports*
DATA+ — *Filing system for lap-sized computers*
SORT2+ — *Sorts DATA+ files*

BIGGER LITTLE BOXES
~~DBASE II~~ — *The one against which others must be measured*
~~QUICKCODE~~ — *Training wheels for DBASE II*
~~DBPLUS~~ — *Compresses DBASE II files for compact storage*
R:BASE 4000 — *A faster, more helpful new contender*
R:BASE EXTENDED REPORT WRITER (XRW) — *Facilitates generating reports from R:BASE*
CONDOR III — *Similar to R:BASE; better with numbers, slower*
INFOSTAR+ — *Moves reports into WORDSTAR*
ASAP FIVE — *Automatic starter, automatic transmission*
~~SEQUITUR~~ — *A little slow, but handles text nicely*

GARBAGE BAGS
DATAFAX — *Like a highlighter pen*
SUPERFILE — *Free-form notes, bibliographies*
NOTEBOOK — *For CP/M computers*
THINKTANK — *Outlining with both sides of the brain*

ORGANIZING YOUR COMPUTER ENVIRONMENT
PROKEY — *Fingertip shortcuts for IBM*
SMARTKEY II — *Fingertip shortcuts for CP/M*
VIDEX ENHANCER II — *Apple II+ keyboard enhancer*

RECOMMENDED SINCE JUNE 1984
HABADEX — *An address/phone/date jukebox*

RECOMMENDED HERE
FILEVISION
DBASE III
MAXTHINK

UPDATE

The DBASE phoenix

TONY and ROBBIE FANNING: *The Big Noise is DBASE III. It's big and faster'n'hell at doing all the stuff that DBASE II did slower'n'hell, like sorting and indexing. DBASE III outdoes DBASE II in the numbers game (128 fields to 32, 4000 characters/record to 1000, a billion records to 64K, 10 data files can be open instead of 2, etc.), so that it can manage bigger and more complex databases. It also has a decent online help system which includes prompting as well as quick lookup of all commands.*

The main reason for getting DBASE III, just as it was for getting DBASE II, is to develop customized database management applications via its programming language. If you have developed or used DBASE II applications, you can (more or less) automatically convert them to DBASE III and they'll really wail. DBASE III also includes a QUICKCODE-like screen generator, which makes life a lot simpler for beginners. Some DBASE II commands have been retired and a lot of new ones put in place, but old DBASE II users will find the new kid familiar. And the old annoying DBASE II bugs are gone! . . . probably to be replaced by new ones . . .

WAYNE CHIN: *You can almost forgive DBASE III for being merely what DBASE II should have been when it was converted to 16-bit machines a couple of years ago. But the Ashton-Tate practice of forcing you to use the system diskette (even with a hard-disk system) as a key disk to start DBASE III is almost unbearable for developers.*

TONY and ROBBIE FANNING: *Poor R:BASE 4000, shooting its nasty/clever arrows into all of DBASE II's weak spots for such a long time; and just when it started catching up with DBASE II in the marketplace, the target moved.*

SHARON RUFENER: *I recently reevaluated R:BASE 4000, setting up a project for a client with it. It works well with small amounts of text, and for looking up data, which makes it good for informational databases, but it's not good for accounting applications because you can't post data from one file to another. The manual is good and comprehendible as far as it goes, which is about 75 percent of the way. I found their customer support deplorable. You can, if you throw tantrums, eventually get someone on the phone who knows something. From what I've seen of it, I'd probably choose THE SMART DATA MANAGER instead (see Managing Update, p. 86).*

TONY and ROBBIE FANNING: *The simple-as-water PFS: family (PFS:FILE, PFS:REPORT, PFS:SOLUTIONS, etc.) quietly continues to sell at its fantastic rate. Now that Software Publishing has also licensed it to IBM to sell as its ASSISTANT family, it's doing even better . . .*

THINKTANK has become one of the best-selling business programs in a few short months, and its outlining features are now imitated in other programs. MAXTHINK is an inexpensive "cover" of THINKTANK, with some added features (see review). FRAMEWORK, the Ashton-Tate rush-to-market "work-processing" package, claims to do the same type of outlining (plus a lot more). Not so for outlining, but true about the lot more. I've used THINKTANK and FRAMEWORK both heavily, and find that THINKTANK is definitely more suited to creating: brainstorming, organizing chaotic thinking, and rearranging ideas (I'm talking about the IBM PC version; I've heard cries of disappointment about the Macintosh version, which doesn't even word-wrap lines of text). As far as its "idea processing" is concerned, FRAMEWORK, for which I have a perverse and unaccountable weakness, is better used for assembling blocks already created, though one could with effort do THINKTANK-style outlining. FRAMEWORK makes me feel like a chemist, grouping and regrouping the atoms; THINKTANK makes me feel more like Shakespeare. The world needs both scientists and poets, so that's fine.

SEQUITUR has fallen on bad times, along with much of the rest of the software industry. Perhaps DBASE and R:BASE would have killed it anyway, even if it had been doing well. Both are faster, cheaper, and more capable. SEQUITUR was still one of the best early '80s DBMs. We're in the mid-80's now, unfortunately.

ORGANIZING ACCESS

DBASE II ($500), **DBASE III** ($700), **FRAMEWORK** ($700): Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230; 213/204-5570 • **R:BASE 4000** ($500): Microrim, 3380 146th Place S.E., Bellevue, WA 98007; 206/641-6619 • **PFS:FILE** ($80-$175), **PFS: REPORT** ($125), **PFS:SOLUTIONS** ($20 each application): Software Publishing Corp., 1901 Landing Drive, Mountain View, CA 94043; 415/962-8910 • **THINKTANK** ($145-$195): Living Videotext, Inc., 2432 Charleston Rd., Mountain View, CA 94043; 415/964-6300 • **SEQUITUR** ($800): Golemics, 2600 10th Street, Berkeley, CA 94710; 415/486-8347.

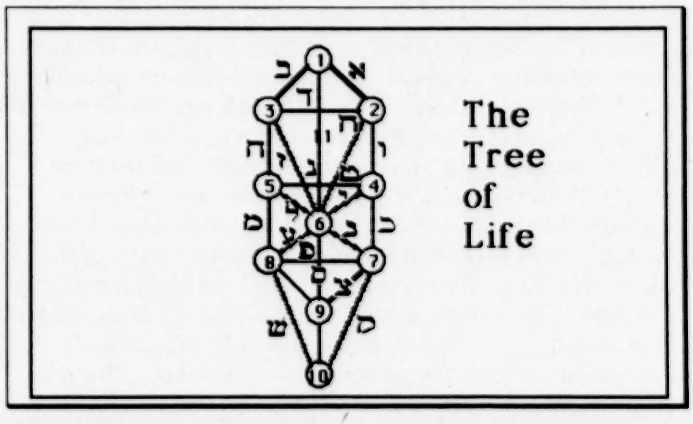
A new kind of organizer: diagrams

FILEVISION

Howard Metcalf, Matthew A. Jacobs and David J. Murray. Version 1.0. Copy-protected. $195. For Macintosh. Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, CA 90405. 800/554-2469, in CA 800/368-3813.

JAY KINNEY: *This is an imaginative "visual filing" program that reminds me of nothing so much as one of those large map displays at turnpike rest stops where different points of interest are highlighted on the map and a descriptive paragraph about each spot lights up when the proper button is pushed. FILEVISION enables you to create a diagram or picture from scratch and attach the equivalent of a file card of information to individual elements in the diagram. For instance, you might draw a map of the United States with separate files for each state, as well as for major cities, traveling salesmen, or toxic waste dumps. As you click the cursor on each visual symbol and ask for "info," the "filecard" for that symbol comes to the front of the screen. Files can also be called up and visually highlighted in other groups and orders that you might specify. A menu of stock universal symbols is provided along with an easy method for creating new visual symbols of one's own.*

FILEVISION is elegantly designed and fun to use. Features such as linking files in one drawing with other drawing files — with the ability to quickly jump between the two — are handy. Similarly, the ability to print out labels from file groupings, or print out files themselves, makes FILEVISION a plausible though limited database, not just a program to create graphics with extended footnotes. →

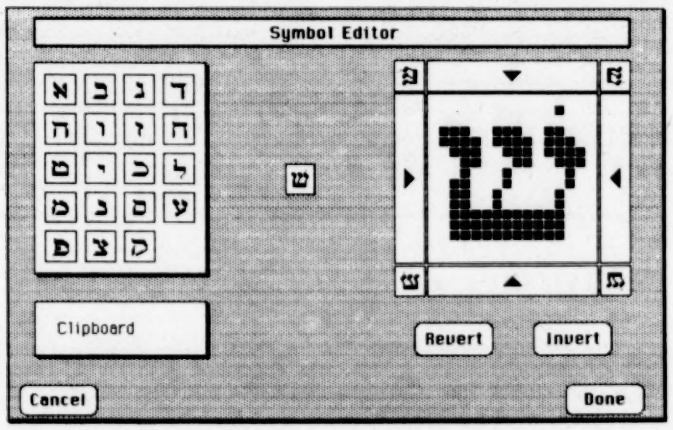


FILEVISION organizes information with pictures. Jay Kinney, who edits a new magazine about Western spiritual traditions, used it to render the Tree of Life, which is a primary diagram of the Jewish mystical teaching called Kabbalah. The Tree of Life's spheres, called Sephiroth, represent various levels of emanation from God and qualities of the divine.

Sephirah of the Tree of Life

Name	Number	Translated
Binah	3	Understanding
Chesed	4	Mercy
Chokmah	2	Wisdom
Daath	0	Knowledge
Geburrah	5	Strength
Hod	8	Glory
Kether	1	Crown
Malkuth	10	The Kingdom
Netzach	7	Victory
Tipareth	6	Beauty
Yesod	9	Foundation

JAY KINNEY



Here is the FILEVISION screen on which Jay Kinney composed the Hebrew characters that represent the paths between Sephiroth on the Kabbalah Tree of Life; and (below) his listing of the files for each of the Sephiroth. The files also include other characteristics associated with each sphere, such as colors, incense, and the names of archangels. One limitation of FILEVISION popped up in this project: the Tree of Life requires 22 Hebrew letters for its 22 paths, but the program allows you to design no more than 20 visual symbols to represent one type of file.

Nevertheless, just as the turnpike map would be impractical for the glove compartment of the average motorist, it remains to be seen whether FILEVISION addresses the real needs of Macintosh owners. Business presentations might benefit from FILEVISION's visual snap, and there are obvious educational uses where students would interact with diagrams and drawings. But home use is another matter. The example in Telos Software's ads of a visual file for a home wine collection is a truly frivolous contrivance.

TOM ZITO (aboard the S.S. Lash Italia): *The other day, the chief mate of this freighter walked into my stateroom (where I have been holed up trying to finish a book) with a problem: we were going to linger in Cadiz, Spain, longer than expected because some containers had been stowed in the wrong positions and needed to be reorganized — or overstowed, as they say in the container ship business. He had a pile of xeroxed papers with container positions written on them, and I decided to introduce him to FILEVISION. I sketched out a rough approximation of the ship on the screen (the program works like MACDRAW), drew in the container positions, and then created a blank file form with all the information from his xeroxed sheets: destination, weight, contents, container number. With a click of the mouse I linked each of the visual images of the containers to its corresponding data file. After that, all the chief mate needed to do was point to a specific container and zap, the information he needed to relocate it appeared on the screen. The program could even do simple equations to show, for instance, all the containers not going to Istanbul that weighed less than 40 tons.*

ANTHONY REVEAUX: *There is a wave cresting within the Macintosh surge that will increase FILEVISION's effectiveness: the affordable image digitizer, a forthcoming device that will scan printed text or pictures, and code them into MACPAINT or FILEVISION files. There are two digitizers coming: Koala's, using a home video camera, and ThunderScan's, which will attach an optical scanner to the MacIntosh's Imagewriter printer. Either one will be able to take a map of San Francisco, a star chart, or a photograph of a family reunion, and turn them into data backgrounds for FILEVISION. The combination of Macintosh, digitizer, and Imagewriter will become a hybrid of copy camera, Xerox machine, Polaroid, and even (through telecommunications) facsimile machine and videophone.*

For writers, managers, and planners

MAXTHINK

Neil Larson. Copy-protected. $60. For IBM PC/compatibles. MaxThink, Inc., 230 Crocker Ave., Piedmont, CA 94610; 415/428-0104.

CLIFFORD FIGALLO: *Directly related to word processors, idea processors let you enter and manipulate ideas and organize your thoughts on the computer screen in list or outline form. MAXTHINK stands out in this small crowd of $150 – $200 programs that was previously dominated by THINKTANK.*

Though warnings of MAXTHINK's complexity preface the manual, complexity is no obstacle since MAXTHINK is structured in layers that allow the new user to use simple menu selections to organize lists, manipulate and structure outlines, and do basic word processing. Deeper command levels allow for faster entry and data manipulation. At its deepest level, MAXTHINK includes TPL, a thought-processing language for customization of the program.

MAXTHINK picks up where THINKTANK left off. It includes "brainstorming" commands such as PRIORITIZE, CATEGORIZE, and RANDOMIZE that encourage you to shift perspective by changing the order or grouping of ideas quickly. Help menus are available at any point in the program. And an UNDO command works on all main menu selections. Menus on all screens are optional so the program can be command- or menu-driven. ESC backs you up to the previous screen from any trouble spot.

The current version calls for 192K in RAM, which limits my data storage for an active file to 42K — plenty for most uses. Upcoming versions, though, will use virtual memory where the size of an active file will be limited only by disk space available. For writers, managers, and planners, MAXTHINK offers a lot of power for a low price, and the 10-day guarantee makes for an almost irresistible offer.

CLIFFORD FIGALLO

1 How the Heavies twist the market's arm •
marketplace •
Events such as advertising blitzes, new product releases, press leaks
regarding new products and internal policy changes all affect
sales •
Apple Computer's actions are more out front than IBM's, though no
less subtle •
4 Results can be seen in sales curves •
5 Results can be seen in other products and companies going under — the
SHAKEOUT •
→ 6 Apple and IBM are going at it for the home/business market •
7 IBM is moving toward a proprietary operating system and is probably
going to try to grab more of the software market for its own
machines (So say Dvorak and PC Week)•
BRAINSTORM: Main Binsort Categorize Divide Fence Help Join
Levelize Prioritize Randomize Sort Tag Untag
Prioritizes sequence of topics
PATH 0 1 6
35944 Bytes MAXTHINK

MAXTHINK organizes information in a flexible outline. Here's an essay-in-progress on the machinations of the computer industry. Each line of text stands in for a group of paragraphs. You shuffle their order by highlighting the numbers that represent them and manipulating those highlighted numbers with the commands of the bottom menu.

ACCOUNTING

Recommended in the Whole Earth Software Catalog

PERSONAL FINANCE PROGRAMS

MANAGING YOUR MONEY — *Worth buying a computer for*

DOLLARS AND SENSE — *Speed, flexibility, and a great capacity*

FINANCIER II — *Versatile, easy to use, yet sophisticated*

HOME ACCOUNTANT — *Handy, especially with forms*

MONEY STREET — *Simple and cheap*

SMALL BUSINESS PROGRAMS

THE ACCOUNTING PARTNER — *Sensible double-entry system*

PEACHPAK 4 ACCOUNTING — *Expandable for growing small businesses*

BOOKS! THE EXPANDABLE LEDGER — *For the old-fashioned bookkeeper*

BPI GENERAL LEDGER — *A workhorse for small businesses, flexible*

PRICEY AND SOPHISTICATED

THE BOSS FINANCIAL ACCOUNTING SYSTEM — *Full-featured and carefully designed*

PEACHPAK 8 ACCOUNTING SYSTEM — *A fine, market-tested integrated system*

THE CHAMPION — *Extreme ease of use*

IUS EASYBUSINESS SYSTEMS — *Security-conscious accounting with excellent support*

REALWORLD ACCOUNTING — *Minicomputer ancestry, ideal for high volume*

OPEN SYSTEMS — *Once it's set up it's top of the line*

GREAT PLAINS HARDISK ACCOUNTING — *Hard disk on the Apple III*

TAXES

TAX PREPARER — *Supplies 90% of paperwork most people need*

PERSONAL TAX PLANNER — *Schemer's helper, cheap*

MICRO-TAX — *A significant timesaver for the professional tax-preparer*

MASTER TAX PREPARER — *Designed for the tax professional*

UPDATE

Welcoming the new domain editor

ART KLEINER: *The Software Catalog's Accounting domain editor, Marsha Mather-Thrift, has left review writing for ficiton writing. In her place, Whole Earth's office manager Andrea Sharp will now evaluate and review accounting software. Andrea was originally hired here as a researcher in 1974, but a year later our bookkeeper left abruptly; Andrea took over. She's been at it nine years, marshaling an ever more complex bookkeeping apparatus to cope with our perpetually expanding and shrinking array of projects. Andrea uses CHAMPION on a Compaq Plus for bookkeeping, with SUPERCALC3 for spreadsheets and budgets. She's simultaneously hard-headed and idealistic about accounting.*

ANDREA SHARP: *The program HOME ACCOUNTANT (**WESC**, p. 98) has some added enhancements now. The current versions can now print checks, using specified check formats. (They don't have version numbers; make sure you get the correct one.) They are also working on a Macintosh version that is targeted for a Christmas release.*

Dick York, our local real estate expert (and landlord), is evaluating an inexpensive investment program for us. I would very much like to know what you out there are using: why you like it, its best features, and what else there is in the realm of bookkeeping and financial hoo-ha that you'd like to see reviewed.

ACCOUNTING ACCESS

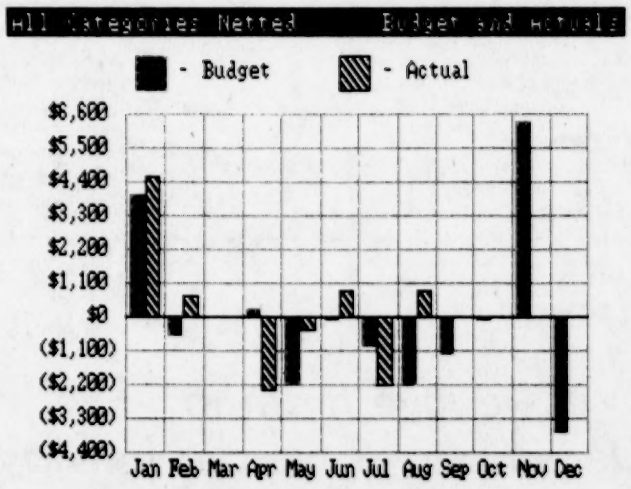
HOME ACCOUNTANT ($75-$100): Arrays, Inc., Continental Software, 11223 S. Hindry Ave., Los Angeles, CA 90045; 213/410-3977 • **THE CHAMPION** ($500-$600): Champion Software Corp., 17301 West Colfax Ave., Building 250, Golden, CO 80401; 800/243-2626, or (in CO) 303/278-8666 • **SUPERCALC3** ($400): Sorcim/IUS Corp., 2195 Fortune Dr., San Jose, CA 95131; 408/942-1727.

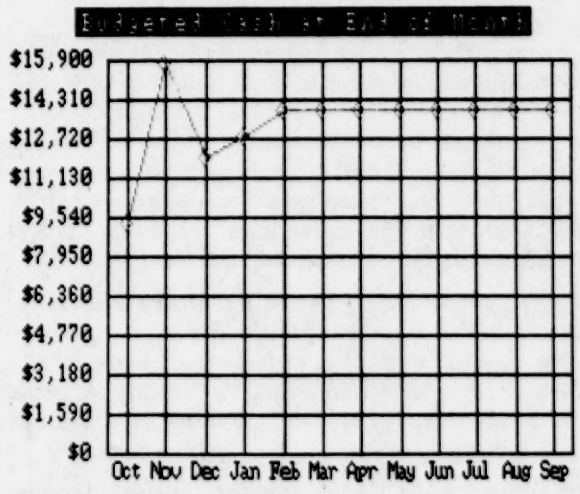
Like a monthly financial checkup . . .

MANAGING YOUR MONEY

Version 1.0. Copy-protected. $200. For IBM PC Family (128K)/PCjr (256K)/compatibles. MECA, 285 Riverside Ave., Westport, CT 06880; 800/631-6322, in CT 800/633-6322.

STEWART BRAND: *I get asked, "What's your favorite program?" Answer: Andrew Tobias' MANAGING YOUR MONEY, by a mile. No other program is so utterly useful, so well designed, so well written (not the code, which seems fine, but the words on the screen), so humor-*





STEWART BRAND

MANAGING YOUR MONEY printouts of the reviewer's bottom line for 1984 — all income versus all expenses, with reality (through August) compared to budget, followed by my predicted cash situation for the coming months.

MANAGING YOUR MONEY is unique in that it speaks to you in a personal voice, that of financial author Andrew Tobias. Though there's a fair amount of good financial advice in the program, for his full story get Tobias' *The Only Investment Guide You'll Ever Need*, reviewed on page 62. This is a program that will pay for itself quickly — $200. It may even pay for the cost of an IBM PC compatible to run it on — $2,000 - $4,000. It'll help you save money: it'll demolish uncertainty, which may be worth even more.

ous, so easy, so exploitive of what a computer does best.

It's a life-brightener, a marriage-saver. Money, as they say, matters. Most of us can keep up with the checkbook, but investments, tax stuff, loans, insurance, each seem to inhabit worlds of their own, from which come a steady supply of bad surprises. This program eliminates all that. All of those "chapters" in the program, in your life, keep track of each other and keep a steady summary of their overall effect on your financial health. For the first time I not only know what's going on, I relish my monthly session with the program, when the actuals take on the imagineds (the budget), and I come out ahead or behind in the computer game of life.

Ken Uston gave the program a rave review in the **Software Catalog**, but I don't think we made it clear how much better it is than DOLLARS & SENSE or HOME ACCOUNTANT or any other program for home application. For the monthly user like me to the daily stock market adept, MANAGING YOUR MONEY combines awesome completeness with ingenious simplicity.

MANAGING

Recommended in the Whole Earth Software Catalog

INTEGRATED PACKAGES

OPEN ACCESS —
Lots of options, but spreadsheet prevails

FRAMEWORK — *An all-in-one geared to text work*

INTUIT — *An intuitive manuscript organizer*

AURA —
Power and flexibility in an integrated package

SYMPHONY —
The spreadsheet that communicates

~~JACK2~~ — *Like a jackrabbit*

~~THE INCREDIBLE JACK~~ — *Apple all-in-one for home use*

JACK REPORT — *Basic, easy*

APPLEWORKS —
State-of-the-art integration for the Apple

INTEGRATORS

~~DESQ~~ — *A multicolored juggling act for well-muscled systems*

MEMORY/SHIFT — *Cheap substitute*

THE DESK ORGANIZER —
A computer "secretary" for $298

PROJECT MANAGEMENT SOFTWARE

HARVARD PROJECT MANAGER —
The dean of project managers

MILESTONE — *Clear, inviting, instant scheduler*

THE CONFIDENCE FACTOR —
A versatile, unorthodox project manager

"VERTICAL" SOFTWARE FOR BUSINESSES AND PROFESSIONS

EXACT DIMENSIONS! — *For the builder's toolkit*

THE MASTER BUILDER —
Construction management for the little guys

CONSTRUCTION MANAGEMENT —
Heavy-duty construction tool

CALPAS3 — *Energy analysis, fancy*

MICROPAS — *Energy analysis, plain*

SUNPAS — *Solar design on the Apple*

LEAD MANAGER 1.0 —
Taking care of salespersons' paperwork

THE REAL ESTATE CONSULTANT —
Keeping track of real estate

THE SALES EDGE — *A controversial sales tool*

PSYCHOLOGIST'S BILLING SYSTEM —
Billing for psychologists and psychiatrists

PERSONAL LAWYER SERIES —
Your IBM replaces your lawyer

VERDICT — *Legal billing for small firms*

LITIGATION MANAGER —
"Litigation support" running on micros

FARM LEDGER PRO —
Computing down on the farm

MAIL ORDER PRO —
All-purpose aid for mail-order businesses

RECOMMENDED HERE

SIDEKICK

UPDATE

Will we love them in December as we did in May?

SHARON RUFENER: *Biting the dust — sadly — the promising JACK2, a friendly little integrated word processor/spreadsheet/file manager/graphics package. The problems seem to have more to do with the software business area than with the quality of this product — JACK's publisher, Business Solutions, Inc., couldn't survive. OVATION was another promising all-in-one. It gathered lots of premature attention but may never reach market because of development delays, money problems, and a lot of competitors crowding the field.*

Now we hear that the ambitious integrator DESQ is in trouble. Whether it will survive the software wars is questionable. Seems the dealers found it too complex to master well enough to demonstrate. Perhaps we are seeing the handwriting on the wall for software which opts to sacrifice amiability in favor of power and versatility.

One thing the world needs is an easy-to-use all-in-one for the floppy disk IBM PC. SYMPHONY and FRAMEWORK (and AURA and OPEN ACCESS) really belong on a hard disk. Give them less and they don't run so much as lurch. JACK2 would have fit comfortably into two floppies and minimal memory, but it looks like it will vanish unless it finds a new publishing sponsor. That leaves only INTUIT for floppy disk users, still the vast majority of IBM PC/compatible owners.

INTUIT is a sweet little easy-to-use all-in-one system with a word processor oriented toward structured reports, good form-letter capability, a basic file manager, and a simple and programmable spreadsheet. It has one major problem — although it's being sold, it's not quite ready for the market. The basics are in place but the exterior needs more polish. The reference manual mumbles and meanders, but there's a new improved version scheduled to appear by the time you read this.

Another annoyance (or difference of philosophy): there are no safety nets to filter out "oopses" — no UNDO, no ARE YOU SURE? Also there is no onscreen text reformatting for word processing. What you see is not necessarily what you get in your documents.

INTUIT has modest aspirations (compared to those of FRAMEWORK or SYMPHONY), and is clear and simple once you figure things out. They have added a couple of features not covered in our review in the ***Software Catalog****. Their spreadsheet now has "goal-seeking" — it will recalculate backwards from the bottom line as well as in the normal top-down direction. There's a useful checkbook/accounting add-on package. At $90, INTUIT is the steal of the year.*

We're enmeshed in research on two sets of packages. A new and amazingly impressive-looking heavyweight contender has just appeared. It's called the SMART INTEGRATED SYSTEM and consists of three interactive programs — spreadsheet, word processor, and superb (at first glance) data manager — which are as powerful and nicely designed as anything yet seen. Not only do they promise to deliver top-of-the-line goods, they bend over backwards to make everything accessible to a newcomer to computing. A full review will follow next issue. We're also reevaluating DESK ORGANIZER in light of its competitors — the amazingly low-priced SIDEKICK and the

new SPOTLIGHT from Software Arts (who developed VISICALC). There is active disagreement among our people so far as to which one does the best job of stashing your notes, dialing your phone, acting like a calculator, and keeping track of your appointments.

MANAGING ACCESS

AURA ($500): Softrend, Inc., 2 Manor Parkway, Salem, NH 03079; 603/898-1896 • **OPEN ACCESS** ($700): Software Products International, 10240 Sorrento Valley Road, San Diego, CA 92121; 619/450-1526 • **INTUIT** ($90): Noumenon Corp., 512 Westline Dr., Alameda, CA 94501; 415/521-2145 • **TIME LINE** ($400): Breakthrough Software Corp., 505 San Marin Dr., Novato, CA 94947; 415/898-1919 • **DESK ORGANIZER** ($300): Warner Software, Inc., Dept. Z, 666 5th Ave., New York, NY 10103; 212/484-3070 • **SIDEKICK** ($50): Borland International, 4113 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-8400 • **DESQ** ($400): Quarterdeck Office Systems, 1918 Main St., Santa Monica, CA 90405; 213/392-9851 • **SMART WORD PROCESSOR** ($395), **SMARTDATA MANAGER** ($495), **SMART SPREADSHEET WITH GRAPHICS** ($495), **SMART INTEGRATED SOFTWARE SYSTEM** ($900): Innovative Software, Inc., 9300 West 110th St., Suite 380, Overland Park, KS 66210; 913/383-1089 • **SPOTLIGHT** ($150): Software Arts, 27 Mica Lane, Wellesley, MA 02181; 617/237-4000.

Two automated mental universes, both overwhelming at first, but FRAMEWORK is terrific

SYMPHONY

$695 ($200 with 1-2-3 trade-in). For IBM PC Family (320K)/compatibles. Needs 2 disk drives; color graphics board required for graphics application. Lotus Development Corporation, 161 First Street, Cambridge, MA 02142; 617/492-7171.

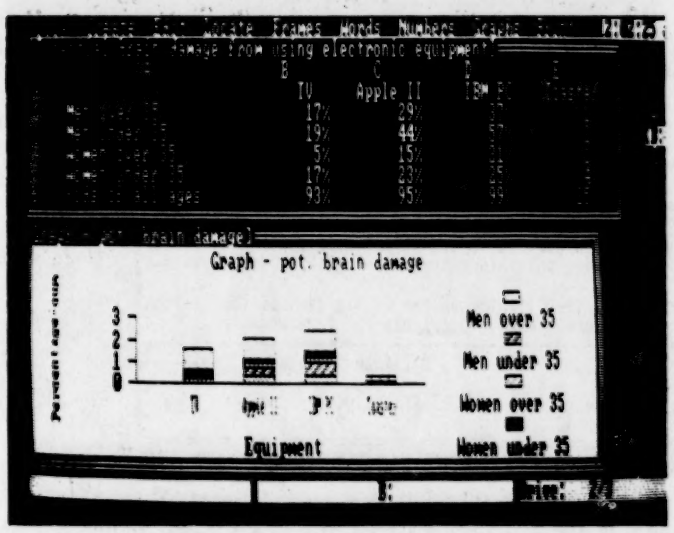
FRAMEWORK

Version 2.0. $700. IBM PC Family (256K)/compatibles. Needs 2 disk drives. Ashton-Tate, 10150 W. Jefferson Blvd., Culver City, CA 90230; 213/204-5570.

ART KLEINER: *We're evaluating SYMPHONY and FRAMEWORK in depth only partly because they've been ballyhooed — mostly because they're the most accessible of a new type of program. Like other integrated software, they can help you write, calculate, organize data, make graphs, and telecommunicate all within one package. But SYMPHONY and FRAMEWORK are made to be customized relatively easily. They're mental building-block sets to help create your own conceptual universe for use mostly in business. For instance, you could write a program that would cause a single command to dial into the Dow Jones online news service, pull down a set of stock prices, make them into a graph, add the companies' addresses from a mailing list, write a letter, insert a prewritten introduction and epilog, and ship the whole thing off by electronic mail.*

Who needs these programs? Corporate micro mavens will want both to set up customized versions for their coworkers — of SYMPHONY for spreadsheet users and advanced telecommunicators, of FRAMEWORK for everyone else. Microcomputer veterans seem to love FRAMEWORK's speed and agility as soon as they encounter it. People using many repetitive (but small) spreadsheets seem to like SYMPHONY. Either would work well for amateur programmers. If you're a first-time microcomputer user, SYMPHONY is inappropriate. FRAMEWORK might be the great but arduous adventure that ties all your work together.

RICHARD DALTON: *Warning: Integrated software packages have yet to prove their worth. They are invariably complex (meaning they take a long time to learn) and expensive in subtle ways — they don't cost more*



ART KLEINER

FRAMEWORK makes graphs easily. The top window in this screenshot is a spreadsheet, composed in honor of our "Computers as Poison" theme. The bottom window is a bar graph based on that spreadsheet, designed and formed in about three minutes.

than equivalent collections of individual programs but they require more hardware. That generally means at least 512K of memory chips and a hard disk, even if the specs say they can operate with less. That, folks, is expensive.

ART KLEINER: *And frustrating. The things are consumptive monsters. I started writing this section with FRAMEWORK on a 256K Compaq. After 21K of text (a few pages' worth) the program froze, telling me I'd need more memory. Sure, I should have forseen that, but the irritating task of recovering my text and transferring it into simple, pleasant PC-WRITE soured me on both SYMPHONY and FRAMEWORK.*

Note Woody Liswood's complaint on page 82 that SYMPHONY has too little workspace for the large spreadsheets he customarily uses, and this comment from Charles Spezzano: "At a local computer store, the owner and I tried to load a 700-record, 150-character-per-record database into a 640K PC and FRAMEWORK said there was not enough room!"

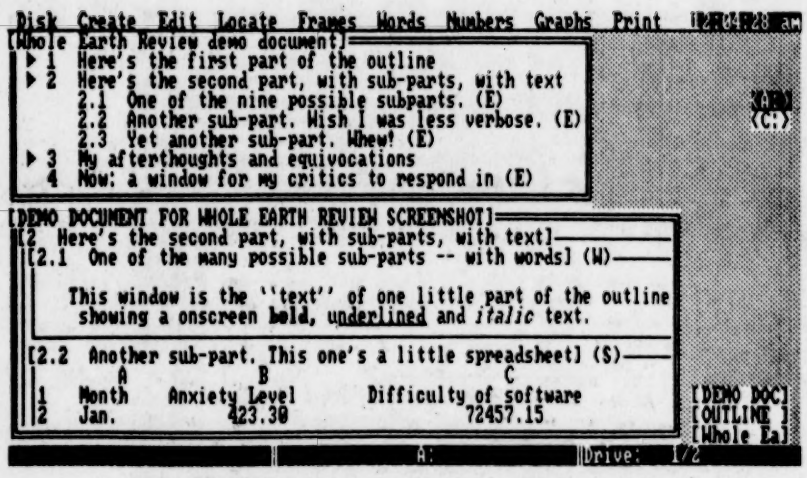
SYMPHONY and FRAMEWORK are primitive, full of weaknesses that won't emerge until people have used them a while. Says Richard Dalton, "I look forward to the second generation of integrated software packages and won't be suprised if the vendors bear little resemblance to the ones marketing this first round."

Yet with all their problems, these are exciting programs.

KEN MILBURN: *With FRAMEWORK or SYMPHONY, if you're careful about the circumstances: You spend between four and seven hundred dollars for one program, instead of eight to sixteen hundred for four programs to do the same work. All your common tasks are reachable from one disk. You don't have to constantly search for the right floppy. You can use more or less the same commands throughout your work. You save training time and have less to remember later. You can easily transfer information — so after spending valuable time entering data in a spreadsheet, you can automatically turn the bottom-line figures into a graph, then use both in a letter.*

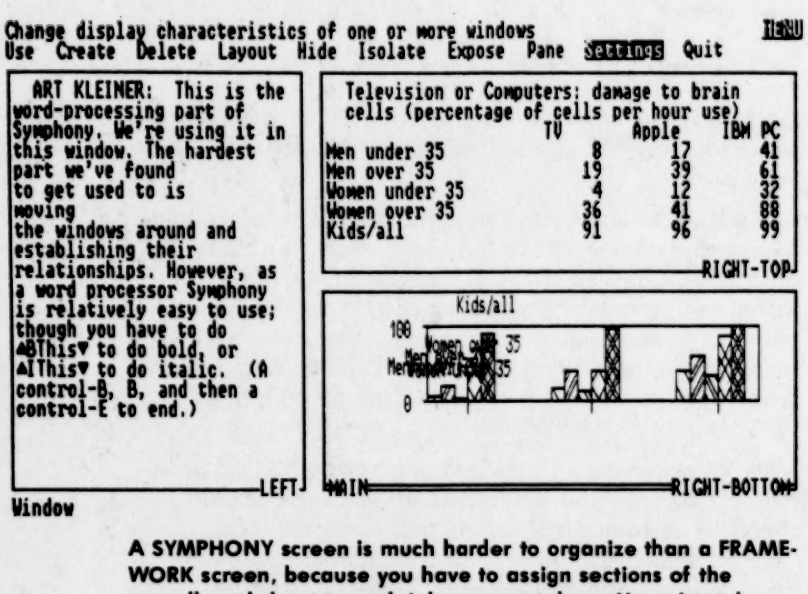
TED NELSON: *No useful application is small or easily contained. The programs you really need sprawl in all directions. You don't just want to make note of a certain record (like a deductible payment), you want it instantly to affect your tax records, budget, and cash on hand. A given entry should fan out its consequences — which vary considerably depending on the type of entry — throughout your world of information, and without your having to go out to any stupid operating system.*

ART KLEINER: *We sicced several people on this compari-*


Disk Create Edit Locate Frames Words Numbers Graphs Print
[Whole Earth Review demo document]
1 Here's the first part of the outline
2 Here's the second part, with sub-parts, with text
2.1 One of the nine possible subparts. (E)
2.2 Another sub-part. Wish I was less verbose. (E)
2.3 Yet another sub-part. Whew! (E)
3 My afterthoughts and equivocations
4 Now: a window for my critics to respond in (E)
[DEMO DOCUMENT FOR WHOLE EARTH REVIEW SCREENSHOT]
[2 Here's the second part, with sub-parts, with text]
[2.1 One of the many possible sub-parts -- with words] (W)
This window is the ''text'' of one little part of the outline showing a onscreen bold, underlined and italic text.
[2.2 Another sub-part. This one's a little spreadsheet] ($)
A B C
1 Month Anxiety Level Difficulty of software
2 Jan. 423.30 72457.15
[DEMO DOC]
[OUTLINE]
[Whole Ea]
A: Drive: 1/2

ART KLEINER

FRAMEWORK's best feature is its overall organization, shown here in a printout of the screen. The cursor is now on the "A" drive; if you hit the return key, a window would appear with all the "A" drive files listed in it. That's shockingly easy compared to most software programs, where calling up a new file usually requires mental contortions.


Change display characteristics of one or more windows
MENU
Use Create Delete Layout Hide Isolate Expose Pane Settings Quit
ART KLEINER: This is the word-processing part of Symphony. We're using it in this window. The hardest part we've found to get used to is moving the windows around and establishing their relationships. However, as a word processor Symphony is relatively easy to use; though you have to do ^B^This^V to do bold, or ^A^This^V to do italic. (A control-B, B, and then a control-E to end.)
LEFT
Television or Computers: damage to brain cells (percentage of cells per hour use)
TV Apple IBM PC
Men under 35 8 17 41
Men over 35 19 39 61
Women under 35 4 12 32
Women over 35 36 41 88
Kids/all 91 96 99
RIGHT-TOP
Kids/all
100
0
MAIN
RIGHT-BOTTOM
Window

ART KLEINER

A SYMPHONY screen is much harder to organize than a FRAMEWORK screen, because you have to assign sections of the overall worksheet to each job you want done. Here, I established three tasks — a written document, a spreadsheet, and a graph based on the spreadsheet — and assigned each to a particular range of rows and columns. Then I opened windows centered on each of the tasks. The top line contains one of SYMPHONY's many confusing menus; if I hit return now, it would produce another menu of "Settings." I never did make the graph come out right; no doubt I could have figured it out in another hour or two.

*son: visionary author (**Computer Lib/Dream Machines**) Ted Nelson; microcomputer consultant Ken Milburn; Organizing domain editor Tony Fanning, and some computer network correspondents. The general response: respect for SYMPHONY. Delight in FRAMEWORK.*

***JIM SCARDELIS:** SYMPHONY, and its predecessor 1-2-3, are nothing more than spreadsheets. They accept and process text, but internally it's all handled as spreadsheet labels. One drawback with SYMPHONY is that it only uses one worksheet, and places windows onto different areas of that one spread — oops — worksheet. This means that if you're not careful you could write all over different documents that you wanted to keep separate.*

FRAMEWORK, on the other hand, treats all its frames as individual entities. I find this far more natural. One of its neatest features is the DOS Access Window. With this, I can go out, gather information with other programs, and then pop back into FRAMEWORK, edit my transaction, and incorporate it into a report. Hmmm . . . I wonder if I could successfully run SYMPHONY from FRAMEWORK?

***TONY FANNING:** I like FRAMEWORK for writing. It has a natural feel, like a cross between MICROSOFT WORD and MACWRITE. It has nice pointing features, what-you-see-is-what-you-get with all print enhancements, automatic reformatting of paragraphs, and pull-down/pop-up menus for all sorts of power. FRAMEWORK is set up so that it conflicts very little with the conventions you've learned using other word processors, so it's easy to switch to. Of course, FRAMEWORK doesn't have the full power of WORD — and I don't need it. And it doesn't currently support a mouse (though it could easily support the Mouse Systems one).*

FRAMEWORK is also fine for spreadsheets, data management, and one flavor of ''outlining'' (rearranging parts, rather than creating them). Its communications module is MITE, and the fit is not as seamless as with other functions, though it does work OK for an afterthought. The business graphs print nicely and quickly on most prints; in fact, they look better than SYMPHONY graphs. It's amazing that FRAMEWORK can even print graphics on a daisy-wheel printer like my Diablo 630 (it prints slow, but you can do it).

*It took me ten minutes to get familiar with FRAMEWORK, sans manual, sans demo. Then I did the tutorial, which is entertaining, though a touch aimed at the feebleminded. About a half hour. Then I used it a lot fooling around; then I tried to use its programming language FRED and found that the basic FRAMEWORK documentation doesn't give you a clue! The **Programmer's Reference**, at $25, cleared that up. Eventually you can toss windows (excuse me; frames) around like a madman and set up useful-looking stuff like stored memo formats and then you get tired of all that flash and drop back to FRAMEWORK basics.*

FRAMEWORK has a pleasant enough database, using the now-standard tabular layout of most relational database managers. It sorts and selects in a much simpler way than 1-2-3 (or SYMPHONY), which continue to foist finger-tangling spreadsheet conventions for data management on all those unsuspecting beancounters. As a data manager and word processor, SYMPHONY sure is a great spreadsheet.

***KEN MILBURN:** Both programs strain to keep their commands consistent from one type of task to another. FRAMEWORK succeeds better. Its menus pull down from the top of the screen, like those menus on the Macintosh. Lotus shows only one horizontal-line menu at a time: there are so many menus that you may lose track of where you are.*

The most important organizational difference is that FRAMEWORK keeps track of each of its windows as a separate file on disk. SYMPHONY maintains all of its windows on one spreadsheet in the computer's volatile memory. This allows for faster data manipulation, but severely limits the possible size and complexity of any job. If you run out of memory in FRAMEWORK, you can break your work into subcategories and store them on disk. You may have to juggle some windows, because you can only open as many frames at one time as your working memory will hold.

Transferring information from one section to another is easier in SYMPHONY. You highlight the information you want to move, switch to the window you want to move it to, place the cursor where you want it to appear, and hit RETURN. FRAMEWORK uses each window as part of the structure of an outline. You should plan your structure ahead of time before moving data, because only text-mode frames will accept data from other types of frames.

Ironically, conceptualizer FRAMEWORK has a larger spreadsheet, capable of more complex number crunching, and spreadsheet SYMPHONY has a better word processor: stronger in cursor movement, more like a dedicated word processing machine, but lacking an UNDO command. The file managers are equivalent in

power, but FRAMEWORK has more interesting forms generation and better sort/select capabilities, and it fits well with the very powerful multilevel database management program DBASE III (see page 83).

FRAMEWORK is more programmable. It comes with a built-in procedural language. SYMPHONY must be programmed by pushing it through a chain of steps — easier, but less versatile.

***TED NELSON:** FRAMEWORK is a virtual Macintosh. I love the Macintosh dearly, but consider it very confusing what with all the pictures of diskettes and folders. FRAMEWORK has an apparently identical conceptual structure — a layout which visually shows things that are open and things that are closed but near at hand. But FRAMEWORK presents this structure and lets you tap-dance through it in a clearer way. Open and closed files are visually more alike. They must have taken a good look at the Macintosh when they designed FRAMEWORK.*

SYMPHONY, by contrast, is Lotus' generalization of the idea of spreadsheets — a virtual machine based upon a checkerboard of text and numbers, the way FORTH is a virtual machine based upon a stack. You can swap data between disk files and sections of the spreadsheet which you define. All the data you're working on has to fit into SYMPHONY's one big sheet somehow. It's real estate to be planned and cordoned off for your different purposes, and looked at through different types of windows — especially spreadsheet and document windows. →

UPWARD MOBILITY

(Getting data from one program to another)

KEN MILBURN: You hear about new integrated software, but you don't buy it. Why? Because you've spent the last two years creating indispensable information with your old, outdated, awkward software. The new package makes its giant gains in speed and flexibility partly because it stores its data in some cryptic compressed format. There's no way it's going to understand your old text files, spreadsheets, or names and addresses.

That's why a universal file transformer is high on my list of "software that ought to be." It could translate a file created by virtually any program into one acceptable by any other program. You would pick format names out of "from" and "destination" menus, naming the path and file. A stroke of the ENTER key would then tell the computer to perform the translation automatically. There should also be a configuration menu for new and oddball file types, in case your favorite application is too weird to be on the standard menu. I've had programmer friends tell me (1) that this is a brilliant idea, (2) they'd sure like to have a copy, and (3) it wouldn't be that hard to write. But where is it?

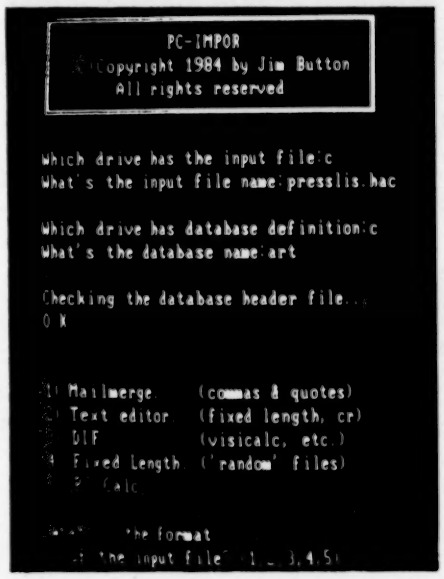
In the meantime, transforming your data from one program to another, though difficult, *is* possible. There are some excellent file transform programs in the public domain, particularly for CP/M computers and the IBM-PC workalikes. The most useful for me is UNWS — it converts WORDSTAR files to ASCII (straight text) and vice versa, so you can move files to another word processor. A variation (faster, better, nicer screens, harder to find) is WS2DOS. Similar programs convert VISICALC and SUPERCALC files to LOTUS 1-2-3.

ART KLEINER: How do you find the right file transform program? Since some are available only in public domain, there are three sources. The easiest is your local users' group, where someone will sell or copy for you the appropriate transfer program from DIPWORD to BLANKSTAR on your particular format. By telecommunicating, you can find many file transform programs on the CompuServe Special Interest Group conferences (see the **Whole Earth Software Catalog**, p. 146) or bulletin boards. Or you can patronize one of the mail-order public domain software houses listed in Alfred Glossbrenner's **How to Get Free Software** (1984; $14.95 from St. Martin's Press, 175 Fifth Avenue, New York, NY 10010, or Computer Literacy bookshop).

KEN MILBURN: LOTUS 1-2-3 and SYMPHONY can convert to and from the DIF format used by VISICALC and SUPERCALC — plus the popular DBASE II format and ASCII text. Thus you could convert an ASCII file to DBASEII by converting it first to Lotus format, then to DBASE. FRAMEWORK, Ashton-Tate's integrated product, will translate data to and from ASCII format and DBASE only.

Are you getting the idea that ASCII text can be converted to almost anything? If your present word processing, database, or spreadsheet program can send printer output to disk, instead of to the printer, it will create an ASCII text file on the disk. That's how most programs create transformable data, but check the manual of a program to see if it can do this before you buy it (sometimes the print-to-disk feature is hidden in the manual).

There's another catch. The spreadsheet or database program to which you want to send the ASCII file may require it in a particular format. Spreadsheets (and some DBMSs) usually look for text arranged in rows and columns. Most databases look for a "records and fields" format, in which each record is separated by a hard carriage return, each field by a delimiter chosen by the program. Delimiters are ASCII characters, usually a comma, slash, or backslash. SYMPHONY and FRAMEWORK both use commas and quotation marks.


PC-IMPOR
Copyright 1984 by Jim Button
All rights reserved
Which drive has the input file:c
What's the input file name:presslis.hac
Which drive has database definition:c
What's the database name:art
Checking the database header file...
O K
Mailmerge (commas & quotes)
Text editor (fixed length, cr)
DIF (visicalc, etc.)
Fixed Length ('random' files)

Will you be able to transform your old database or spreadsheet files into new files for a new program? One solution is this conversion program, part of the inexpensive PC-FILE.III.

ART KLEINER

You can tediously edit the ASCII file to meet the requirements of the program you want to send it to. Or you can buy PC-FILE.III ($35), which includes a free utility program that converts all the most popular data formats into and out of it. If that doesn't work, NUTSHELL ($150) allows you to "paint" an input or output screen to correspond to the way the data should look — in other words, you can customize your own delimiters — and Alpha Software's DATA BASE MANAGER II — THE INTEGRATOR ($295) includes conversion utilities for many popular formats.

PC-FILE III ($50): Buttonware, P.O. Box 5786, Bellevue, WA 98006; 206/746-4296
• **NUTSHELL** ($150): Leading Edge Products, 21 Highland Circle, Needham, MA 02194; 800/343-3436 or (in MA) 617/449-4655
• **DATA BASE MANAGER II: THE INTEGRATOR** ($295): Alpha Software, 30 B St., Burlington, MA 01803; 800/451-1018 or (in MA) 800/451-1018.

The problem with one big spreadsheet is that changes can have undesirable effects downstate; if you add a column in the place you're working it could mess things up in other parts of the spreadsheet. So Lotus localizes these effects by letting you fence in rectangles of the grid — "restrict ranges" — which you must keep track of.

Much of SYMPHONY was done in a main-frame of mind. It's better set up than FRAMEWORK to prepare data for, and interact with, mainframes; it'll do unattended dial-up, log-in, query, and sign-off, without boxing you into a particular data format. SYMPHONY also makes possible an unattended home base machine with password security.

SYMPHONY is not easy to start with. The set-up complications are fierce, and it is hard to begin to use, except for plain vanilla spreadsheet and word processing, which are not what the system is really about. The current manuals give details but no overview, and the details you want are not easy to find. For instance, you are cautioned to do word processing only within "restrict ranges," but it took me a long time to figure out how to set a restrict range up. And there is real clumsiness. For almost every serious operation you have to do a lot of set-ups and prearrangements — to dig a garden, in effect, before you plant anything.

But one of the beauties of spreadsheet programming is you can create applications incrementally. Get a basic set-up working quickly, then use the partially-built system to find out how you want to change it.

A SYMPHONY program is written simply by turning on the LEARN toggle and making your menu choices. This stores the steps for later replay! (It's called "programming by example.") This makes SYMPHONY an excellent programming language for beginners and casual users. (Or maybe for post-beginners who've hit the wall that limits you in BASIC.) SYMPHONY has a two-dimensional structure like BASIC's 2D arrays, and the ability to roam through them visually at any time. It represents a new kind of programming, because you have to think about where to set up the rectangles of data. You have to think a lot about the origami of the big sheet.

It's harder to get into than FRAMEWORK, but more powerful if some complex hazy application beckons you from the horizon.

DRAWING

Recommended in the Whole Earth Software Catalog

BUSINESS GRAPHICS
BPS GRAPHICS —
Easy to use, great for slide presentations
FASTGRAPH —
Basic business graphics, plus slideshow
GRAPHWRITER —
Good, but no slideshow
MICROSOFT CHART —
Quick, efficient visuals
EXECUVISION —
For presentation graphics

PAINTING SOFTWARE
FLYING COLORS —
Automatic slideshow
4-POINT GRAPHICS —
The cursor splits into four brushes
KOALAPAD — *Drawing tool for a variety of programs and machines*
MOVIEMAKER — *A little animation*
MOUSEPAINT — MACPAINT *in color on Apple II*
LUMENA or EASEL — *The most professional painting package available*

2-D COMPUTER-AIDED DESIGN (CAD)
PC-DRAW — *Low price, good for simple drawings*
ROBO-GRAPHICS CAD-1 —
Introductory program, good for isometrics
CADPLAN — *Medium precision*
AUTOCAD — *Professional 2-D drawing, precise through 127 layers*
VERSACAD — *Top-notch for IBM*
CADAPPLE — *Top-notch for Apple*

3-D COMPUTER-AIDED DESIGN (CAD)
ENERGRAPHICS/PC —
Low price, requires math knowledge
3DESIGN — *Inexpensive introductory package*
ADVANCED SPACE GRAPHICS — *Stick modeling and 3-D distance calculations*
CUBICOMP CS-5 —
Loaded with features, priced accordingly

RECOMMENDED SINCE JUNE 1984
MACDRAW — *Tools for the draftsman*

RECOMMENDED HERE
PICTURE IT
VIDEO SHOW
QUICK-DRAFT
THE DIGITAL PAINTBRUSH SYSTEM

UPDATE

The spawning of Lumena

ART KLEINER: *With this issue Rik Jadrnicek leaves our Drawing domain editorship (he may contribute occasional reviews). Replacing him is Donna Cohen, who has juggled several computer graphics roles since 1978. She teaches students at the Academy of Art College in San Francisco how to use microcomputer graphics software; as a commercial artist, she's worked with business graphics software, microcomputer paint programs, computer-based animation, and video. She's also consulted on the graphic look of software such as the remarkable TRANSEND PC (**WESC**, p. 154). Her next assignment for **Whole Earth Review** is to compare programs that emulate MACPAINT on other computers.*

*The premier profesional paint packages in our Catalog, Time Arts' LUMENA and EASEL, have changed sinced June. (They're the packages artist James Dowlen used to create our **Whole Earth Software Review** cover graphics.) EASEL, which formerly ran on the IBM PC, has been replaced by LUMENA, which previously ran only on the Mindset. On the PC, LUMENA requires one of two hardware/software support systems. Time Arts' own is called the Tesserac subsystem, and costs under $10,000. It includes a 10 megabyte hard disk, video input and output, fonts, animation, 16.8 million colors (must be an interesting challenge to refer to a particular color by name), and 256 colors onscreen at one time. The other system, from Number Nine, costs half as much but is less versatile. Neither system includes drawing tablet or color monitor. More systems will follow; check with Time Arts for details.*

$10,000 sounds like a lot just to add graphics to your PC, but the result compares favorably with $20,000 professional CAD (computer-aided design) systems. The Mindset offers almost comparable quality for $3,000, if it can survive long enough to catch on.

Rik Jadrnicek notes that he had to pay the full software price recently for an upgrade to EASEL. A fair price might have been 1/3 the cost. If you buy from Time Arts (which we still recommend), make sure you ask about their upgrade policy.

DRAWING ACCESS

LUMENA available on **Tesserac Subsystem** (under $10,000): Time Arts, Inc., 3436 Mendocino Ave., Santa Rosa, CA 95401; 707/576-7722 • **LUMENA** software ($2500) and **Revelation graphics board** ($2045): Number Nine Computer Corp., 691 Concord Ave., Cambridge, MA 02138; 617/492-0999.

GENERAL PARAMETRICS

The Videoshow 150 may replace slide projectors in corporate boardrooms. Plug in a floppy disk, hook this box to a video projector (like an Advent), and see the graphics you created on your IBM PC reappear large scale. The bad news: you can only use the Videoshow with its companion paint program, PICTURE IT. The good news: PICTURE IT is excellent.

$100,000 worth of graphic resolution with a PC: PICTURE-IT • VIDEOSHOW

PICTURE-IT: Version 1.1. Copy-protected. $600. For IBM PC/compatibles (128K). Requires VideoShow 150 hardware display driver ($3500; connects to any NTSC digital RGB monitor). Both from General Parametrics, 1505 Solano Avenue, Berkeley, CA 94707; 415/524-3950.

DONNA COHEN: *Business graphics is the largest commercial use of computer-generated art, grossing billions of dollars a year. Most of this money is spent on slide presentations; executives seem to enjoy gathering in dark conference rooms and watching financial data on large, colorful slides.*

PICTURE-IT doesn't feel very creative to draw on — the keyboard is the only artist-input device — but it produces a high-quality product comparable to images produced on GENIGRAPHICS or DICOMED, two of the high-end ($100,000 and up) dedicated business graphic workstations. It's far superior to EXECUVISION, BPS GRAPHICS, or FASTGRAPH, the other business packages we recommend.

PICTURE-IT is simple to use, with a logical feel and good sense of graphic design. It isn't necessary to be an "artist" to use this software to make good-looking slides. There are more than twenty different formats and color styles to choose from, or you can design your own styles and color schemes, choosing from 1000 colors. There are also 18 built-in type fonts.

You can use PICTURE-IT without reading the manual. It anticipates subtle needs that business people have. For instance, in most graphics software, your numbers for plotting pie charts must add up to 100 percent. But PICTURE-IT refigures the percentages whenever you add new data. It's a pleasure seeing the computer crunch numbers — something it's better at than people — in a graphics program.

PICTURE-IT uses a new display technology which they call MacroVision. It breaks each pixel (picture element, the smallest discrete unit of a video display) into three little microdots, thus increasing the IBM PC's resolution to 484 × 2048 pixels, from 200 × 640. MacroVision works through a companion presentation device called the VideoShow, a 16-pound box with a built-in disk drive. It needs no computer, just a monitor, projection screen, or television set. It eliminates the hassle of slide trays, projectors, and the completely dark room. Store your images on a disk, bring the disk with your white box, and it's presentation time. Last minute updates and changes are no longer a big deal; turn on your computer, make a change, and poof! it's done and ready to show.

Like a laser videodisc, the VideoShow box lets you jump out of order to any part of your presentation. A hand-held remote control permits quick cuts to the next image, fancy dissolves, or a variety of built-in transitions. You can control a pointer through the remote handset, and move it around an image to highlight a specific point. You can set the VideoShow to loop through its images, or record them into several types of video signals. No other business graphics system has worked out its video interface so well.

Picasso and Pollock could have collaborated: THE DIGITAL PAINTBRUSH SYSTEM

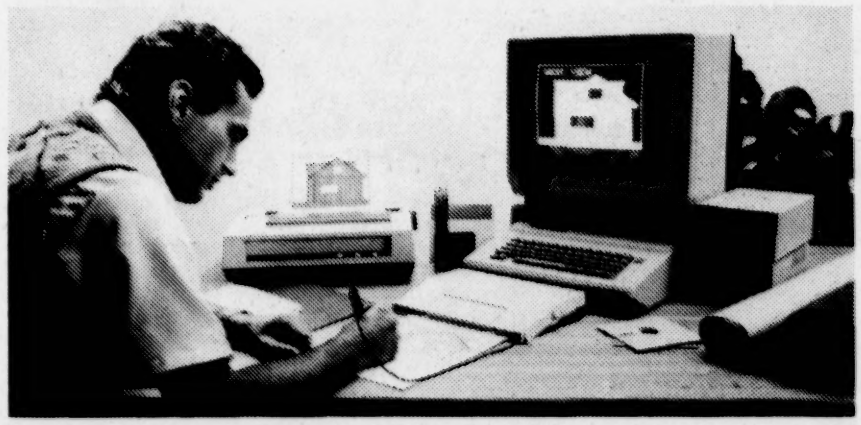
John Norby, Glenn Arbinger and Glen Hamilton. Version 1.0. Copy-protected. $300. For Apple II+ (needs memory expansion card)/IIe/IIc. The Computer Colorworks, 3030 Bridgeway, Sausalito, CA 94965; 800/874-1888 (in California, 415/331-3022).

DONNA COHEN: *This software comes complete with its own funny-looking electronic drawing device — a pen attached to a white high-techy-looking box by two dacron pullstrings, connected to the computer through its game board. The white box acts as a clipboard; you fasten papers to trace from. I traced a picture in a quarter-inch-thick magazine. The drawing device is a million times more comfortable and accurate than any mouse I've worked with, and the alternative, a digitizing tablet, costs hundreds of dollars more. The pen has a nice toggle feature which turns the graphics menu on or off, clearing the way for a full-screen image.*

The software includes a paint program, a text editor, a show-pictures program, a telecommunications program, and a format-disk program. In many ways the program mimics more expensive computer design stations, especially with its library of graphic symbols and type fonts.

However, I found a few problems. The program combines text and pictures clumsily; you can't edit text while in the drawing mode, only before. You must tediously recalibrate the drawing device every time you turn on the computer. And there are a couple of small bugs. But the manual is clear and easy to read, no other program lets you telecommunicate drawings so easily, and the electronic pen is unique and works superbly. Every paint program should be able to use it or one like it.

KEN GOEHNER: *Using the telephone graphics program, one can transmit graphics around the planet. Not only can you send images, you can comment on them as well. You can draw simultaneously onscreen with another DIGITAL PAINTBRUSH user, communicate by typed-in conversation, and talk on the phone while transmitting a*



THE COMPUTER COLORWORKS

The pen with which this man is drawing, and the "high-techy-looking" box to which the pen is attached, comprise the DIGITAL PAINTBRUSH SYSTEM's electronic drawing device. It's more comfortable and accurate than any mouse, cheaper by far than any digitizing tablet. It's excellent for tracing an existing paper sketch into the computer to be modified. A drawing made with this system's software is shown on the screen and printer; another such drawing appears on the back cover of this issue.

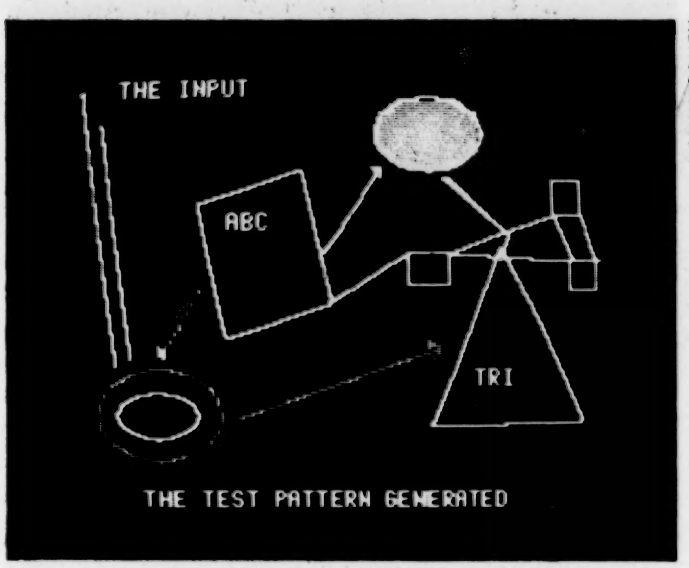
graphic. (You hear hum on the line from the computer, but that's a small price to pay with a system that will make easy Engineering Change line orders from Chicago to Taiwan.)

Boilerplate schematics and flow-charts: **QUICK-DRAFT**

Dr. Paul K. Warme. Not copy-protected. $50. For Apple II+, /IIe. Interactive Microware, P.O. Box 139, State College, PA 16804; 814/238-8294.

DONNA COHEN: *Use QUICK-DRAFT to create technical drawings, formulas, schematics, and flow charts. The most impressive and powerful feature is the "object library" — you tell the computer to start remembering, and everything after that — all lines, words, circles, or marks you enter — is recorded in the computer memory until you press a key to stop. Later, you position the cursor where you want the image to be drawn, and the computer reproduces your earlier sequence. You can save up to 20 drawing sequences — very useful for diagrams and schematics with similar components. You can also make large drawings four times the area of the screen, and scroll the screen over them like a window.*

This program does not require a mouse, Koalapad, game paddle, or joystick, but using one of these interfaces makes the process more enjoyable and creative. Whether or not you choose to use an input device, this is a keyboard-oriented program. Each of the 26 commands requires a single keystroke. QUICK-DRAFT offers selection of type fonts, including the Greek alphabet and many scientific symbols. All symbols can be rotated and scaled. This is not a playful paint program, but if used with preplanning and organization, it's an efficient, versatile drafting tool.



DONNA COHEN

A quick sketch showing what QUICKDRAFT does best — shapes, lines, and words for flowcharts and diagrams. The lines were drawn by joystick; the shapes were chosen with easy-to-learn one-letter commands; the words are available in 19 fonts. QUICKDRAFT lets you compose sub-sections of a diagram, and plug them into other drawings wherever you wish. Other paint programs like MACPAINT can do the same (with some fudging), but only QUICKDRAFT runs on the inexpensive Apple IIe.

TELECOMMUNICATING

Recommended in the Whole Earth Software Catalog

ONLINE TRANSACTIONS
Comp-U Store — *Online discount shopping*
Source PUBLIC — *Publish online and get paid for it*
BANK-AT-HOME — *Online money tenders*

ONLINE SERVICES FOR INVESTORS
Dow Jones News Service — *Stock quotes within 15 minutes*
Independent Investors Forum — *Most comprehensive of all*
Source Unistox — *Cheapest daytime stock quotes*
CompuServe MicroQuote — *Cheapest stock quote, nighttime*
The Desk Top Broker — *Buy and Sell*
Media General DataBank — *Heavy on statistics*
Disclosure II — *Financial balance sheets for 6,000 companies*
NAARS — *Supplies corporate annual reports*

NEWS SERVICES
CompuServe Information Service — *Superb weather and sports*
Dow Jones News Service — *Four months of business news*
Official Airline Guide Electronic Edition — *Dial-up flight information*
NEXIS — *Top of the line magazine, newspaper, and wire service data*
Source UPI Newswire — *History begins on Saturday*
NewsNet — *Two to three years' worth of expensive newsletters*

ELECTRONIC MAIL
MCI Mail — *Instant delivery at $1 per letter*
EASYLINK — *Low cost access to TELEX*
International Electronic Mail Service (IEMS) — *Connects to corporate mail networks*
SourceMail — *Pay by the minute*

CONFERENCING
CompuServe Special Interest Groups (SIGs) — *Dozens of subjects — or create your own*
Participate-on-the-Source (PARTI) — *A giant information department store*
Confer II — *Customized for large groups*
Electronic Information Exchange System (EIES) — *Vanguard, sophisticated, very effective*

ELECTRONIC BULLETIN BOARDS
AMIS — *Favorite for Ataris*
COMMUNITREE — *Choice software for groups*
NET-WORKS — *Bargain-priced, popular*
COLOR-80 — *If you have a CoCo*
IBBS — *$50 and loaded with features*
CBBS — *Grandaddy gets the job done*
THE BREAD BOARD SYSTEM (TBBS) — *State-of-the-art*
MULTILINK — *Double up on tasks*
MIST//MIST + — *Four packages rolled into one*

TERMINAL PROGRAMS
MITE — *Our benchmark program*
CROSSTALK XVI — *When you know enough to use the best*
MODEM7 — *Least expensive, most used, and a standard*
~~HAYES SMARTCOM II~~ — *Easy to learn, slow to use*
POST-PLUS — *Read and write at the same time*
PC-TALK. III — *Almost free, but a bargain at any price*
TELEPHONE SOFTWARE CONNECTION TERMINAL PROGRAM — *Remembers your commands*
DATA CAPTURE IIe — *For an 80-column Apple*
IN-SEARCH — *Accessible, understandable DIALOG searching*
~~ASCII EXPRESS~~ "THE PROFESSIONAL" — *Works fine, but not for beginners*
AMODEM — *For Atari owners, the best is free*
MACTERMINAL — *First for the Mac, great for graphics*
TRS-80 MODEL 100 — *Traveling communications*
VIDTEX — *When you can't run MITE*
TRANSEND PC — *Cute mailing system, but limited*
IBM PERSONAL COMMUNICATIONS MANAGER — *Junior calls the office*
BUSINESS COMPUTER NETWORK — *Easier way to get started*

MODEMS
Volksmodem — *A basic no-frills machine*
Atari 1030 Modem — *Many features for Atari computers*
VICModem — *Commodore modem, cheap*
AUTOMODEM — *Commodore modem, deluxe*
OPERATOR 103 — *Smart modem, great price*
Visionary 100 — *Low-cost innovative message taker*
Signalman Mark XII — *Very fast, very good*
Multi-Modem MT212AH — *Bells and whistles, does everything*
Visionary 1200 — *Best of the lot for businesses*

FILE TRANSFER
MOVE-IT — *Best for IBM-PC clones and CP/M*
KERMIT — *Micro, mini, mainframe moves*
BLAST — *Big moves, less fuss, but expensive*

RECOMMENDED SINCE JUNE 1984:
PFS ACCESS — *None easier to use*
APPLE ACCESS II — *Best for Apple computers*
PERSON-TO-PERSON — *Comprehensible, with rolodex*
MACTEP — *Hook up your Mac for free*
COMMANDER ULTRA TERMINAL — *Cheap Commodore modem in cartridge*

RECOMMENDED HERE: (p. 77-78)
TEL-LETR
BLACK JACK
212 LP MODEM
DISK +

CompuServe's boon for free-software lovers

ART KLEINER: *This was to be the year of great innovation in personal computer communications, but there's almost nothing new to report but promises. First, the few innovations available now:*

APPLE ACCESS II ($75), reviewed in the third ***Whole Earth Software Review****, but not in the* ***Software Catalog****, is the first full-featured Apple terminal program which I feel comfortable recommending. A terminal program is like a window through which you dial into and view various computer networks and online services for electronic mail, conferencing, or calling up information. Like a window, you want to notice the terminal program itself as little as possible. APPLE ACCESS II replaces the widely-beloved ASCII EXPRESS "THE PROFESSIONAL," a mud-covered window that was heretofore the only Apple terminal program with sophisticated automatic sequences for logging onto networks. APPLE ACCESS II is both versatile and easy to grasp; it fits nicely with Apple's great new all-in-one package APPLEWORKS (*****WESC**, p. 113***), which uses the same filecard-on-the-screen format. Unfortunately, APPLE ACCESS II doesn't fit with any serial port card except Apple's own — if you already own the popular Hayes Micromodem card, you're out of luck.*

I've only seen PFS:ACCESS ($70–$95) on the IBM PC, but I'm told it's similar on the Apple. Like the other PFS: programs, it's transparent without sacrificing too many functions. If I were tentatively getting into computer networking, and didn't want to spend much time mucking around with software, I'd get this one.

PFS:ACCESS replaces HAYES SMARTCOM II, a program I've changed my mind about several times. Parts of it are easily graspable, and some avid telecommunicators (like Tony Fanning and Woody Liswood) love its many features. But I recently tried to train a novice to use it; we got so flummoxed together I ended up suggesting PFS: instead. Though many people use Smartcom II because it comes with the popular in-board Hayes Smartmodem 1200B, I can't bring myself to recommend it.

Richard Dalton notes that TRANSEND PC COMPLETE, the innovative desktop electronic mail program, has an equally innovative sales pitch. Send them a dollar and they'll send a demo disk good for 15 calls. Even if you don't like the program, you'll get to keep the disk. I suspect many will like it, especially in its new version (which we haven't yet seen).

The biggest news since June might seem minor to the uninitiated; the computer network CompuServe has added the XMODEM protocol — a system for ensuring error-free transmission between computers. Previously, if you wanted to collect any of CompuServe's huddled masses of free public domain software over the telephone lines into your computer, you had two choices: use CompuServe's proprietary terminal program VIDTEX, or hope that noisy phone or telecommunications lines didn't cause any inadvertent transmission errors that would make your captured program ultimately unusable (there's probably a 70 percent chance it would come through OK). Now users of most of the software we recommend — MITE, CROSSTALK XVI, APPLE ACCESS II, MODEM7, and PC-TALK.III — can stockpile effectively from what is becoming the best single source of public domain software. Most public domain software writers are active on CompuServe, where they unveil new versions, answer questions, and participate in the multi-dimensional give-and-take of the public domain community. This is a major policy change for CompuServe in the direction of greater compatibility, and it deserves high praise.

Incidentally, VIDTEX is a fine program, and getting better. Commodore has released it in a new cartridge version bundled with their Automodem and called C64 TERM — the best full-featured terminal program for the Commodore, and reasonably priced.

In local area networks, great changes are happening, as our ***Software Catalog*** *local network correspondent Richard Solomon foresaw. Local nets link up computers directly, mostly within buildings, so that personal computers act as each others' terminals. Hopefully the rash of new announcements from companies like AT&T and IBM will filter down into something useful for small businesses within a year. We just had a "review copy" of a local network for Kaypros called LAN/Rover installed in our office (ironically, just as we switched our editorial work to IBM PC/compatibles). All our Kaypros can now switch files, exchange electronic messages, and use the programs on our Kaypro 10's hard disk. Dunno how well it works yet. Comparative reviews of local networks from us will have to wait until either 1) we're set up more effectively to comparatively evaluate them here or 2) we find someone equipped to evaluate them elsewhere. Is anyone out there interested in taking on parts of the job?*

TELECOMMUNICATIONS ACCESS

APPLE ACCESS II ($75): Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; 800/538-9696 • **ASCII EXPRESS "THE PROFESSIONAL"** ($130): United Software Industries, Inc., 1880 Century Park East, Suite 311, Los Angeles, CA 90067; 213/556-2211 • **PFS: ACCESS** ($70-$95): Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; 415/962-8910 • **CompuServe:** CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, OH 43220; 800/848-8990 or (in Ohio) 614/457-8650 • **C64 TERM** ($80, includes modem): Commodore Business Machines, Inc., 1200 Wilson Drive, West Chester, PA 19380; 215/431-9100 • **LAN/ROVER** ($350 per work station): ADEVCO, Inc., 3790 El Camino Real, Suite 329, Palo Alto, CA 94306; 415/493-7466 • **HAYES SMARTCOM II** ($150): Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, GA 30092; 404/449-8791 • **TRANSEND PC COMPLETE** ($229): Transend Corp., 2190 Paragon Dr., San Jose, CA 95131; 408/946-7400.

DON RYAN

It ain't graceful yet. Telecommunication paraphernalia overwhelms Art Kleiner's office.

PROGRAMMING

Recommended in the Whole Earth Software Catalog

LANGUAGES
MBASIC and COMPILER — *Six of one*
CBASIC and COMPILER — *Half dozen of the other*
COMPILER + — *Easy speed*
TURBO PASCAL — *Outstanding value*
APPLE PASCAL — *Complete toolkit*
NEVADA COBOL and EDIT — *Student-sized, student priced*
PERSONAL COBOL — *Cadillac version for IBM*
CIS COBOL — *Cadillac version for CP/M computers*
FORTH — *Compact, fast, extensible*
MODULA-2 — *The very next thing?*
MICRO-PROLOG — *Real artificial intelligence on a micro*
OBJECTIVE C-COMPILER — *Hybrid vigor*
VEDIT — *Programming your text editor*

OPERATING ENVIRONMENTS
UNETIX — *Low-cost UNIX look-alike*
CONCURRENT DOS — *Real live windows*
OASIS 8 — *Fancy operating system for Z-80 micros*

UTILITIES
THE NORTON UTILITIES — *From a real expert*
POWER! — *Operating systems made easy*
DU — *Perfect for hackers*
COPY II PLUS — *Apple doctor*
COPY II PC — *IBM doctor*
MEMORY/SHIFT — *Divides memory to make it multi-user*

RECOMMENDED HERE:
DESK ACCESSORY MOVER
FDUMP

UPDATE

Does this foreshadow MacUnix?

MATTHEW McCLURE: *Three C compilers (see Access) have come out for the Macintosh, all too new to test at this writing. It's fun to watch the development of software for new machines — especially languages, like C and FORTH, that are known for their portability. Since so many of today's programs are written in C, the availability of good C compilers should speed the translations of old programs to the Mac: if it's already written in C on another machine, two-thirds of your work's been done for you. More on this next issue when we've had a chance to try the theory in practice.*

PROGRAMMING ACCESS

SOFTWORKS C ($400): Softworks Limited, 607 W. Wellington, Chicago, IL 60657; 312/327-7666 • **HIPPO-C** (Level 1 - $150, Level 2 - $400): Hippopotamus Software, 1250 Oakmead Pkwy., Suite 210, Sunnyvale, CA 94086; 408/730-2601 • **AZTEC C68K MACINTOSH COMPILER** ($500): MANX Software Systems, Inc., P.O. Box 55, Shrewsbury, NJ 07701; 800/221-0440.

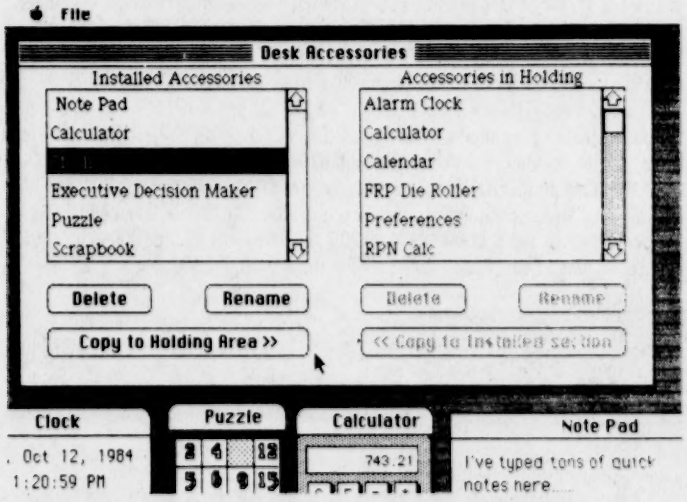
Freeware utility for the Mac

DESK ACCESSORY MOVER

Donald Brown. Version 1.3. Freeware (from your users' group, or send either a blank disk with $15 and a SASE, or $20). For the Macintosh. CE Software, 801 73rd Street, Department M, Des Moines, IA 50312; 515/224-1995.

ANTHONY REVEAUX: *The Macintosh Desk Accessories are like a "backpack" of good tools, but how often do you really need that Alarm Clock, Key Caps, Puzzle, or even the Control Panel? When you realize that they take up 20 precious K of disk space, those gadgets can become like in-laws who have outworn their welcome. With Donald Brown's DESK ACCESSORY MOVER, you can delete and install desk accessories at will and use the program's holding area as a kind of scrapbook to move them from one disk to another. But always leave at least one accessory under the little apple; the Finder needs something there to keep its operational balance.*

ART KLEINER



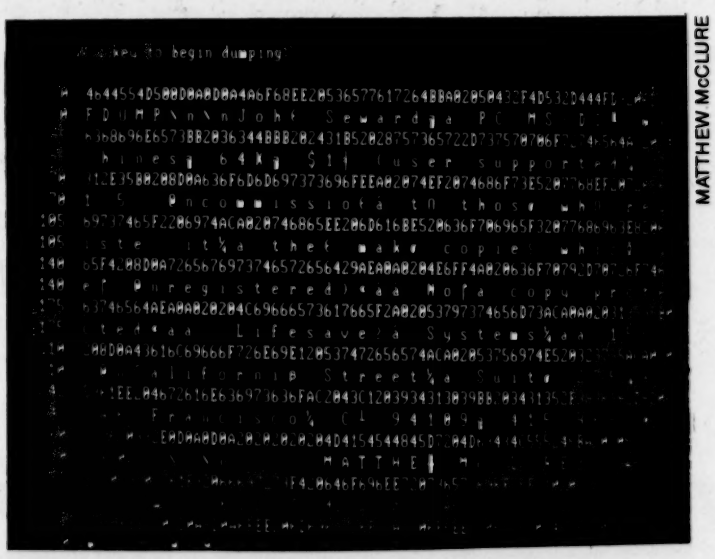
One of the nice aspects of the Macintosh is its line-up of "desk accessories." DESK ACCESSORY MOVER gives you a half-dozen new desk accessories and lets you mix and match them with your old ones.

Simple, but you'll be amused by its presumption

FDUMP

John Seward. Not copy-protected. $20 (user-supported, $5 commission to those who register it, then make copies which get registered). For PC/MS-DOS machines. Lifesaver Systems, 1550 California Street, Suite 275, San Francisco, CA 94109; 415/868-2603.

MATTHEW McCLURE: *When I was first doing serious programming on micros, one of the most valuable tools I had was the file-dump utility that came with our Ohio*



MATTHEW McCLURE

You say you want to write a program that changes a WORDSTAR file into a normal straight-text file? First, use FDUMP. Pour in a WORDSTAR file and see what the hexadecimal equivalent of each letter is. The capital "F" in the first line, for instance, is 46. For its own nefarious purposes, WORDSTAR changes the last letter of each word. FDUMP lets you see that it's actually adding 80 hex (128 decimal) to the ASCII value of the last letter, which makes writing your new program a simple matter.

Scientific. When I started programming on IBM PCs, I was amazed that I couldn't find a similar program for the PC. So some friends and I got together and put this one out as freeware.

If you're writing a program, it's probably going to use data from a file, write data to a file, or both. FDUMP lets you see what data's on the disk and where, so you can tell if your program's doing its job properly. It's a simple little program with just one purpose — to display the contents of the disk on the screen or the printer, in ASCII (the alphanumeric character set that a person can read), hexadecimal ("hex," the most common way of representing the numbers the computer reads), or both, with as many bytes on a line as you like (so if you know each record is 17 bytes long, you can ask for 17 bytes per line and have a new line for each record). You can choose a file name or a disk track and sector, so it is well-suited both for programs running under MS-DOS and those (like MVP-FORTH) which bypass the MS-DOS file structure.

LEARNING

Recommended in the Whole Earth Software Catalog

MILLIKEN WORD PROCESSOR — *Just right for kids*
LEMONADE — *Old-timer with class*
OREGON TRAIL — *Story with good plot*
SIMULATED COMPUTER — *The visible program*
T. REX — *Good sense of environmental forces*
THE HONEY FACTORY — *Accurate simulation of beehive*
D-BUG — *A computer fix-it game*
TRAINS — *Railroading in the Old West*
VOLCANOES — *Scientific method*
SEARCH SERIES — *Group explorations*
JUKEBOX — *No reading skills required*
ALF IN THE COLOR CAVES — *Relies on joystick skills*
BUBBLE BURST — *For five- to seven-year-olds*
WALL $TREET — *Socially approved gambling*
SNOOPER TROOPS CASE #2: THE DISAPPEARING DOLPHIN — *Detective skills*
TEASERS BY TOBBS — *Thinking about numbers*
MONEY! MONEY! — *Civilization's basic skill*
APPLE BARREL — *Guesstimator*
STALKER — *Arithmetic without drill*
THE POND: EXPLORATIONS IN PROBLEM SOLVING — *Discovering patterns*
MAKE-A-MATCH — *Shapes, sizes, colors*
THE BASIC PRIMER — *A magic electronic book*
BANK STREET WRITER — *Easiest word processor to learn*
M__SS__NG L__NKS: A GAME OF LETTERS AND LANGUAGE — *From literary classics in four languages*
KOALAPAD AND KOALA SOFTWARE — *Throw away the keyboard*
COLORING SERIES 1 — *Stored designs for KOALAPAD*
PIECE OF CAKE MATH — *Fundamental main drills*
FRACTION FACTORY — *Making fractions a game*
MUSIC MASTER — *First notes toward composing music*
CATLAB — *Genetically valid kittens*
THE INCREDIBLE LABORATORY — *A witches' brew of data to analyze*
DEVELOPMENTAL LEARNING MATERIALS — *Practice, practice, practice*
WEEKLY READER FAMILY SOFTWARE — *Reinforcing with graphic detail*
ADDITION MAGICIAN — *For the frustrated beginner*
NUMBER STUMPER — *Interactive math lessons*
READER RABBIT — *Mechanical symbols to practice word patterns*
WORD SPINNER — *Classy fill-in-the-letter drill*
BAFFLES — *Deductive reasoning*
MASTERTYPE — *Type for survival*
GERTRUDE'S SECRETS — *Building patterns and logic skills*
BUMBLE GAMES — *Puzzling out problems*
PICTUREWRITER — *Controls drawing speed and direction*
ROCKY'S BOOTS — *Rooms filled with wondrous tools*
MAGIC SPELLS — *Tailorable spelling*
DELTA DRAWING — *Absolutely wonderful*
ALGEBRA ARCADE — *Soaring equations*
FACEMAKER — *Animating Mr. Potatohead*
MATH MAZE — *Arithmetic on the fly*
LOGO — *Thinking about thinking, and drawing*
TURTLE TOYLAND, JR. — *LOGO at its simplest*

RECOMMENDED SINCE JUNE 1984

ATARI LOGO — *For Ataris*
COMMODORE LOGO — *For Commodore*
TLC-LOGO — *For CP/M computers*
DR. LOGO — *Quick and easy for IBM*
IBM LOGO — *Extra powerful for IBM*
PC LOGO — *Runs on small memory for IBM*
KRELL'S LOGO — *Inexpensive, on Apple*
TERRAPIN LOGO — *Well documented*
APPLE LOGO — *Good all around*
APPLE LOGO II — *For the Apple IIc computer*
SPRITE LOGO — *Fancy, with lots of power on Apple*
TURTLE TOYLAND — *Elementary LOGO —*
CYBERLOGO TURTLE — LOGO *without words*
TURTLE POWER — *Training true programming skills*
ATARILAB — *Links up sensing probes to Atari computers*

RECOMMENDED HERE:
KIDS ON KEYS
KIDWRITER
STORY MAKER

UPDATE

Teach 'em work skills while they're young

Illustration of this program on back cover.

ROBERT SCAROLA: *The days are quickly passing when educators viewed anything to do with computing as a worthwhile learning activity. The case can still be made for exploring problem solving with LOGO, learning cognitive (and marketable) skills thorugh programming, practicing sentence construction and math facts, and engaging in interesting simulations in science or social studies. However, those are not the ways most adults use computers. Most of us use them (when we're not playing DONKEY KONG), for writing, organizing data, performing calculations, designing other tools, or telecommunicating. Learning with computers must include the practical applications children can make of these incredible tools to produce work they care about.*

Keyboarding for 4 to 6-year-olds

KIDS ON KEYS

Frieda Lekkerkerker. Copy-protected. $27-$33. For Apple II; Atari; Commodore 64; IBM PC (128K). Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139. 617/494-1200.

ART KLEINER: *Before you can use the computer to write you have to be able to find the keys on the keyboard. For young children with short fingers, "hunt and peck" is an apt (not a derogatory) instruction. Their hungry minds feed on the letters of the alphabet. KIDS ON KEYS makes the feeding more fun than hunting around wall charts or pecking on paper.*

The program provides three games for practicing letter and word recognition skills by finding and typing the correct letter or work before a picture of it floats to the bottom of the screen. Each of the three games has four levels of play that the child uses to control the level of difficulty. Mistakes can be corrected easily by pressing the space bar. Thus the first principles of word processing are introduced: mistakes are OK to make and easy to correct; erasing and rewriting are not a hassle; you can work at (and control) your own pace; the computer is a patient, friendly, helpful, practical tool.

Short-short storytelling for ages 6-8

KIDWRITER

Jim and Jack Pejsa. Copy-protected. $27-$30. For Apple II; Commodore 64; IBM PC. Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139; 617/494-1200.

ROBERT SCAROLA: *KIDWRITER expands on KIDS ON KEYS' use of graphics. The program is based on a concept as old as teaching: draw a picture and write about what you drew.*

The child begins by selecting options from a main menu. The options include making a new picture story (M), loading an old picture story (L), getting a directory of picture stories saved on disk (D), or quitting the program (Q). KIDWRITER's menus all show sensitivity for the capabilities of young children who need press only the first letter of each function.

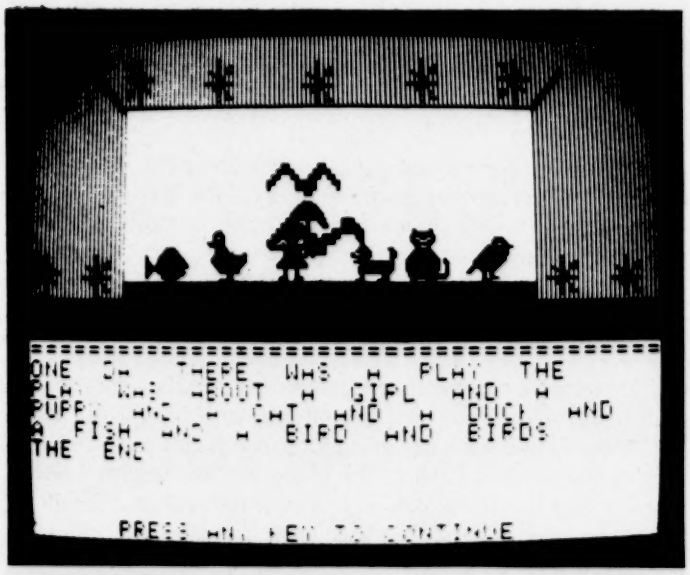
Through a second menu, the new storyteller chooses from 8 different background scenes (a night sky, a room in a house, a theater stage) and 99 different objects (each a stylized but fairly well-done graphic image of common childhood objects such as a girl, boy, animal, cloud, tree, snowman, store, truck, bike, ship, jet, or robot).

A third and final menu allows the child to change the color and size of the object and move it around the screen. After the picture is created, the child can press D for done and the lower half of the screen becomes a simple word processor (or the child can press E for erase and start over again). The word processor has basic editing, deleting, and erasing functions. It allows eight lines of type to be written before the picture and story must be saved to disk. The child can then go back to the beginning and create another picture story page.

The program has some flaws. Inadvertently pressing the E key erases everything. (This is especially easy on an Apple II+ where the commands for moving a picture are CTRL-E, -D, or -X. Just forget to hold down the control key and your creation is suddenly zapped!). The child can't change a picture or story once it's done, nor print out a hard copy.

But the program's creative writing stimulus outweighs these flaws. And children can be warned about them. More than one child said to me, after accidentally hitting the E key and losing everything, "Oh, it's OK. I'll just start over again." The lessons we learn from our failures are just as important as the ones we learn from our successes.

TOFA BORREGAARD JESSICA MAXEY CELIA FRIEDRICH


ONE DA THERE WAS A PLAY THE
PLAY WAS ABOUT A GIRL AND A
PUPPY AND A CAT AND A DUCK AND
A FISH AND A BIRD AND BIRDS
THE END
PRESS ANY KEY TO CONTINUE

In KIDWRITER images and words have a direct relationship. Young children make a small picture, then write a very short story about it. As you can see, the result feels like they've just produced a play although the stage curtain was drawn by a kid — it's not part of the program.

For budding James Thurbers, ages 8-10

STORY MAKER

Bobbit. Copy-protected. $35. For Apple II family; Commodore 64. Sierra On-Line, Inc., P.O. Box 485, Coarsegold, CA 93614; (209) 683-6858.

ROBERT SCAROLA: *STORY MAKER moves a level beyond KIDWRITER. It permits a child to create a combined picture and word story.*

The drawing screen has a function menu for drawing lines, circles, or boxes, choosing a color for filling in, saving a picture, or erasing. The simple one-key commands include U for undo which, unlike KIDWRITER, only erases the last command, not the entire drawing. Drawing is best controlled from the keyboard (I found it much more difficult to be accurate with a joystick) and can be quite detailed.

The writing screen offers a simple word processor like KIDWRITER's, but without the requirement that writing stop after eight lines. The editing functions are neatly summarized at the bottom of the screen. The student may begin by either writing or drawing and switch back and forth between them, inserting graphic illustrations anywhere in the written text simply by pressing CTRL-P and selecting the desired image.

Each story can be saved on a separate disk which can be viewed without the STORY MAKER master disk. It can be sent to a friend as a gift or just kept on file. Stories can also be reaccessed and revised. Unfortunately, as with KIDWRITER, a printed hard copy can't be made. It's a shame, since there is something very satisfying about seeing what you've done (and showing your parents what you've done) in print.

I have seen some startlingly good STORY MAKER illustrations made by students. In fact, left to their own devices the children will spend a lot more time drawing pictures than writing words. The program helps children visualize their stories and gets them interested in imaginative writing in the first place on (or off) the computer.

STORY MAKER is good for third grade and up. First and second graders will find it too difficult to make drawings from scratch and build a story line around them. The graphics cursor commands are also too abstract for these younger children to handle easily.

An illustration of this program appears on the back cover of this issue.

Kids' writing programs revisited

MILLIKEN WORD PROCESSOR

Suzanne L. Zemke, John A. Oberschelt, & IOTA. Version 1.0. Copy-protected. $70. For Apple II family. Milliken Publishing Co., 1100 Research Blvd., P.O. Box 21579, St. Louis, MO 63132; 314/991-4220.

BANK STREET WRITER

Copy-protected. $70-$80. For Apple II family; Atari; Commodore 64; IBM PC/PCjr. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903; 415/479-1170.

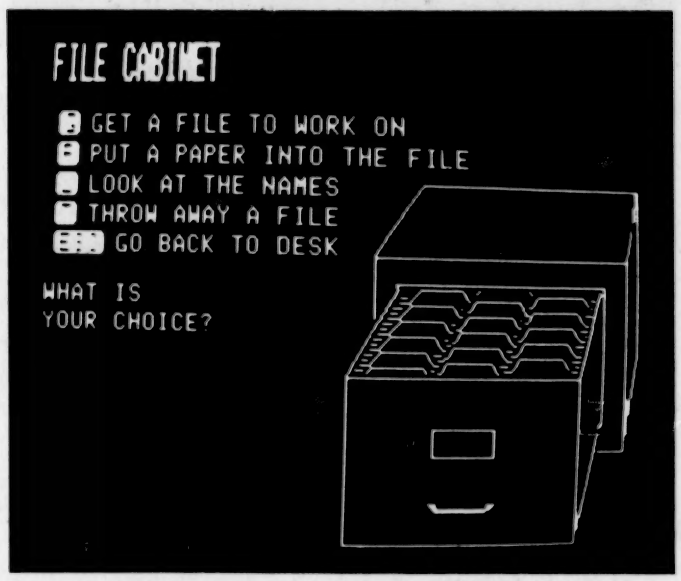
ROBERT SCAROLA: *For kids, word processing programs provide freedom to play with arrangements of words, phrases, sentences, paragraphs, and even pages with no penalty for failure (none of the "I have to recopy it" effort). Just how important is this sense of freedom and play in learning writing? It is too soon to tell. The use of word processors in the classroom has lagged far behind their use in business or the professions. But many teachers, myself included, have noticed that children who learn word processing have a new pride in and dedication to*

their work as they refocus their energy from the mechanical demands of writing to the joy of creating with words.

THE MILLIKEN WORD PROCESSOR, for 9-12 year-olds, is a bridge from writing-enhancement programs like STORY MAKER to full-featured word processing programs like BANK STREET WRITER, whose command keys and menus resemble MILLIKEN's. However, MILLIKEN spells out more clearly what the function of each key is (for example, the screen tells you that B gets you to the "Beginning of Paper" or M will "Move Some Words" or P "Puts a Paper into the File"). The tradeoff for this increased clarity is that, unlike BANK STREET WRITER, you must exit the actual writing screen and go to a separate "Writing Tools" menu screen in order to access these commands. All you may do on the "Paper" screen where the words actually appear is move the cursor or delete words.

The MILLIKEN program also uses graphic icons to show several functions. For example, while you're using the "File Cabinet" to get or save a file of text, a graphic reproduction of an open file drawer appears on the screen. Names of files are then displayed on graphic reproductions of file folder tabs. Unlike HOMEWORD, another word processor with similar icons, these symbols can't be used to trigger commands. But they do give the young writer a useful visual screen reference.

The MILLIKEN program limits the writing screen to about ten lines of widely spaced type with an oversized cursor that looks like a capital I. The limited viewing area causes words to scroll off the screen quickly, a problem for anyone older than 12. But for younger writers the expanded display is a plus. It minimizes the writing area, helps younger children focus, and gives their writing an uncluttered feel. The MILLIKEN printer access menu, which offers a few parameters such as line length, spacing, and page numbers, is also very easy for children to use.



ROBERT SCAROLA

Word processors work with text files, a concept that is sometimes hard for young children to understand. MILLIKEN WORD PROCESSOR makes the process clear with its file cabinet icon and simple one-letter commands. Once kids master how to compose on a computer, the snags of writing seem less treacherous.

From MILLIKEN, I'd move up to BANK STREET WRITER (See **WESC**, p. 184), already the choice of thousands of 10–15-year-old budding writers. The recently improved version offers adjustable margins, print formatting features, and a mouse option for the Apple IIe.

ETC.

Recommended in the Whole Earth Software Catalog

VIDEO LOOM II — *Onscreen warp and weft*
MOUNTAIN COMPUTER MUSIC SYSTEM — *Inexpensive software and circuit board combo play 16 voices*
MUSICALC 1 — *Spectacular and immediately involving*
MUSICLAND — *The most wonderful, imaginative music program we've found*
PMS TYPE 201 WAVESHAPER — *For professional musicians and audio technicians*
MUSIC GAMES — *For serious students and teachers*
MICRO COOKBOOK — *Sophisticated recipe searching*
THE EXECUTIVE COOKBOOK — *Simple and elegant*
NUTRI-CALC — *Counts calories for a week*
IN SHAPE — *Tracks a year's worth of data*
NUTRIPLAN — *Easy to use, one day nutritional analysis*
THE RUNNING LOG — *For serious runners*
HEALTH-AIDE — *The most complex and complete nutritional analysis*
SKYMAP 2000 — *See the night sky*
APPLE/GEMINI LEISURE TIME EXPANSION PACKAGE — *Use your Apple to control a multi-media show*
CELESTIAL BASIC — *Simple programs for astronomers*
POSTMAN — *Calculates shipping costs*
SIDEKICK — *A dashboard full of utilities for the IBM PC*
THE MASTER HANDICAPPER — *I got the horse right here*
CALMPUTE — *Access to inner calm*
RELAX — *Biofeedback software*
EXPERT-EASE — *Rule-based expert system for micros*

REVIEWED SINCE JUNE 1984

DRUM-KEY — *2000 Drum notes in any combination*
METATRAK II — *Your own music studio for $3900*
COMMODORE BONUS PACK — *No-frills entry into electronic music*
MUSIC MACHINE — *Cheapest synthesizer emulator available*

UPDATE

Best delay excuse yet, but maddening

LYN GRAY: *A program briefly mentioned in the* ***Software Catalog****, one we had hoped to review at this time, was James F. Fixx's RUNNING PROGRAM from MECA. Mr. Fixx died this past summer, ironically while jogging. At the time of his death the program was already at the distributors. MECA called back all copies and is still uncertain when the program will be released.*

STEWART BRAND: *A maddening and I think stupid move. It looks like a fine program and carries on the work of a fine writer and athlete. Release it!*

BACKSCATTER

Echoes from readers back to the Whole Earth Review (27 Gate 5 Road, Sausalito, CA 94965)

Hybridizing CoEvolution and the Whole Earth Software Review

Today I received the most recent copy of **CQ**. Gasp! Horror! Disbelief! What the hell are you folks doing? The first thing I read was your report on the Readers' Survey. That was pretty good, most people seemed to like the magazine as is, with a few minor changes. Then I turned the page to read the recent gossip, only to discover that you're killing the magazine as we know it. Come on! Your plan strikes me as inspired idiocy. While I can understand the need to salvage your energy/money that has been put into the struggling **Software Review**, I can't say I think very highly about the planned merger. Speaking for myself, if I wanted a magazine that dealt with relevant aspects of the computer age, I would subscribe to one. Please don't get me wrong, I'm not anti-computer (some of my best friends have a microprocessor for a brain). I'm just anti-devolution.

Your rationale states that about 2,000 people subscribe to both **CQ** and the **WESR**. That's roughly 9 percent of your present **CQ** subscribership. Doesn't that tell you something about the level of mutual interest?

Using your figures to the probable organization of the new mag: while it appears that we'll be getting more pages for our money, at the same time then we're actually getting 18 to 20 percent *less* **CQ**-style material.

Not wanting to dwell exclusively on the negative, I would like to take this opportunity to thank all of you for all the fine material that you've made available in the past. You may not always please all of us, but you definitely give us food for thought. I wish you luck in your upcoming experiment in informational crossbreeding. It's far too early to make an informed judgement on its outcome, so I'll wait with bated breath, and hope for the best.

One last thought in closing: While hybridization may lead to long-term hybrid vigor, it can also result in sterility and still birth. Approach great changes humbly.

Sincerely,
S. McBors
Old Town, Maine

This letter came with a black border

Friends?

For however long I have subscribed to **CoEvolution Quarterly** its arrival in my mailbox has meant hours of mutual celebration of the inventiveness, zaniness, pluck of my breed.

I was a charter subscriber to your **Whole Earth Software Review**. I expected something that would taste and smell and feel of my breed as does **CoEvolution**. It didn't. The first issue was the only one I opened.

So I am disturbed to read that I have received my last issue of **CoEvolution** and will now be receiving a bag mixed of I don't know what. Quote: "Starting in December 1984, this [**Whole Earth Review**] replaces **CoEvolution** as the cutting edge of all our activities." Was I, a dedicated subscriber, included in the "our" of that statement, and, if so, how?

Reflecting on my relationship to magazines I read, I ask, "Did the **Atlantic** come?" "Did **Horticulture** come?" But, on your magazine, I ask, "Did *my* **CoEvolution Quarterly** come?"

I am pained by the announcement.

Sorrowfully,
Laura Lafferty
North Little Rock, Arkansas

P.S. Even the address is changing. Sausalito I trusted; San Diego I don't.

Bad driving out good

. . . I don't want a computer-related magazine. I want **CQ**. Merging a winner (**CQ**) with a loser (**Software Review**) is almost certain to produce a loser.

If you don't see the logic of this, Stewart, it may be because you've been staring into the little green screen too much.

Lynn Nelson
Richmond, Virginia

P.S. If you must change the name, at least drop that *damn subtitle!* Can't you see that the concept "Whole Earth" is fundamentally incompatible with the concept "the computer age"?

This "computer age" stuff is already so *trite* . . . it's hard to believe you've been sucked into it, too.

Tools and ideas for the hype age

. . . I am unhappy with the subtitle. We are not in a "Computer Age." We will not be in one until everybody who wants to own/use a computer can do so. Prices for microcomputers are so high that the benefits go mostly to "males, in their early 30s, with incomes averaging $30,000 — as many computer magazines profile their readers. A tool is only worthwhile when it is accessible to the greatest number of people. Books are great tools, and public libraries are the greatest tool shops in the world! Almost four billion people in the world don't use computers, so how can it be an "Age" except in media hype?

David Meile
Minneapolis, Minnesota

The anti-evolution quarterly

"The Computer Age"? Lousy! Computers are important, sure, but quality and meaning in one's life are the most important things in any age. To give a label to one's time creates a mind-set which is *anti*-evolutionary; expectations eliminate possibilities, and your approach defines your destination.

Aryt Alasti
Cambridge, Massachusetts

Voracious computers

It occurs to me that personal computers are like Von Neumann machines. A Von Neumann machine is, simply, a machine whose function is to use available resources to replicate itself. A biological example is a simple bacteria.

I realized this when I figured out how my computer, which was a modest investment originally, had become a beast requiring its own room, hundreds of dollars in peripherals and even its own magazine. The machine is processing the available resources of my bank account (and mind) in order to replicate itself!

Reading your ideas regarding the **Whole Earth Review**, I see that your computers are engaged in the same process. This is not surprising. It has happened to everyone I know with a personal computer. However, I am frightened to think that my favorite magazine, **CoEv**, is in danger of becoming another part of the machine's insidious growth.

Before I go on, I want you to know that I like computers. I'm writing this letter on one, in fact. I am excited by the possibilities they provide. . . .

But I have seen the tendency of people to become a little crazy about the things, aided and abetted by the guys on Madison Ave. People are infatuated with the new technology,

reminiscent of the way people reacted to mind-altering drugs in the '60s.

Please do not forget that there are things that computers can't do, and that many of the real important things in life are on that list. . . .

Paul S. Davis
Riverside, Connecticut

Frightening implication

It is with much worry and interest that I greet the news that my two friends **CoEvolution Quarterly** and **Whole Earth Software** are to become one. The biggest problem is this: many of us are not able to afford our own software, and must talk our employers into getting what we want/need. I have in the past used the **Software Review** to this purpose, and passed the copy around to the Money-Holders.

Our Higher-Ups are a bit conservative to send a magazine with the likes of "Texas Crude" and "On Farting" (two of my favorites) around and get any credibility. . . .

The **CEQ** has always been eclectic and offered alternatives. Are you not in fact implying that there is no alternative to computers in our lives?

Sorry to sound so negative, but I care a lot about both publications. Don't dull the edges on my best tools.

Bill McAllister
Chapel Hill, North Carolina

Not the only approving letter we received

The **CQ/Software** merge sounds intriguing; I think you're absolutely right in asserting that **CQ** readers thrive on misgivings; and I commend your apparent acceptance, if not espousal, of the Greek concept of *philotimous:* Love of adversity.

James A. C. Dunn
Greensboro, North Carolina

Like an old friend getting married

. . . I am putting faith in you that **Whole Earth Review** will thrill me with its arrival as much as **CQ** did. I feel like an old friend is getting married — I'm happy for you, I know it's time for a change, but I hope I can still relate.

You'll notice I've opted for the Package Deal — I don't know why — I loathe computers — having graduated from U.C. Santa Cruz (where I was first introduced to **CQ** in 1974) I watched many free spirits seduced "over the hill" to Silicon Valley where they became computer programmers, traded their Bugs for Saabs, wore their pants too short & rationalized that San Jose really was a nice place . . . I went to law school to escape technology. Upon deciding criminal defense was for me, I took my first job in Palo Alto — lo & behold one of my first cases involved trade secrets & computer theft. In L.A., the subject may arise again! Computers are inescapable & perhaps your publication will make my long-put-off initiation untraumatic. . . .

Kathy Caverly
Glendale, California

The coevolution of CoEvolution

Without **CoEvolution Quarterly** *there would have been no* **Whole Earth Software Catalog**, *or* **Whole Earth Software Review** *to support it. Without the* **Whole Earth Software Catalog** *project, however,* **CoEvolution** *would have perished ignominiously last year, subscriptions uncompleted, readers and contributors left hanging.* **CQ** *has never made money; Point's financial health lurches from book to book, only the* **Whole Earth Catalogs** *being true money makers, with years in between.*

The **Whole Earth Software Catalog** *infused both money and excitement in an operation that was in danger of becoming stodgy. "Okay, thanksalot, stay out of my face," is a fair response from the computer-disinterested* **CQ** *reader. But what would you have Point do with obligations incurred? The book promises frequent update, and its value decreases markedly without it. What are the 9000* **Whole Earth Software Review** *subscribers supposed to do? Next issue we'll be printing their dismay at losing far more than* **CQ** *readers did.*

I know I feel a helpless rage when my newspaper drops a comic I love. I gnashed my teeth for months when **Scientific American** *messed up its typeface. Dammit, an intimacy and a trust have been violated. I want the editors and publishers to hear my wrath and quake.*

Done.

Stewart Brand

Home schooling and the commonweal

I write in answer to the article, "Home Study Goes Legal," **CQ** Summer '84. Let me start by saying that I am a public school teacher and that I am not totally opposed to home study in certain situations. However, I would not like to see it encouraged as a general movement. It has many drawbacks and limitations.

My biggest concern in this article is with parents who are so unhappy about public education that they seek a solution only for themselves. I take extreme offense to the idea that "the public school classroom destroys whatever instinct for learning a bright child might have." Another parent was quoted, "Somebody should do something about the mediocre level of public education." I hope that parent isn't one who votes for bad legislators or who handcuffs good ones with small amounts of tax dollars allotted for education. California, I believe, is either ranked 47th or 48th in amount of tax dollars spent on public education. But money aside, there are still no excuses for some of the complaints parents stated. These parents wanted only to remove themselves from affecting and changing their school systems. It is the "Me and My Kids" attitude that bothers me. Where those parents really ought to be is in that school and classroom both questioning and helping.

Alison Woolpert
Santa Cruz, California

Damn good question

Just answer me this one: why can't I buy a calculator that does common fractions? Is it some sort of metric conspiracy, to get us all used to repeating decimals? Fractions are what I use in my shop. I bet every carpenter in the country wants one, too.

Fletcher Cox
Tougaloo, Mississippi

Blinding light

Dear New-Skinned Editors of the Livelier Snake:
. . . I was most interested in your cover article, on "The Whole Earth At Night," because I'm an active amateur astronomer and as such I'm greatly concerned with the loss of dark skies everywhere. Most of my vacation time each year is spent at (and in transit to and from) dark sky sites where I can still see the Milky Way as a sparkling mist arching overhead, and where I can prove how far-sighted I am by seeing for over two million miles (the Andromeda Galaxy) without even wearing my glasses.

Amateur astronomers also contribute to the scientific efforts, providing data on variable stars, meteor showers, and moon-star occultations and grazes that help us measure the

moon. We also discover comets, nova and super-novae. Our work is carried on in every state, in every locality, and we, too, are being "washed out" by light pollution.

One approach many amateurs are taking, alongside the professionals, is to become activists against light pollution. These amateurs have banded together to share strategies and resources to educate government agencies and individuals about the problem, and the cost-saving solutions.

I'm taking a different tack: I'm trying to compile a directory of public land which is far (or sheltered) from city lights so that people who want to experience celestial wonders under the best conditions will have a resource for finding the best location. I'm currently in the process of writing to state and national parks and forests and other amateurs, seeking suggestions. Gathering detailed directions on these sites in fifty states is a Big Job, yet what I most need is *more information*. If you know of any suitable sites, or if you can pass my request on to others who might, I'd appreciate it. The specifics I need are:

> (Public land only) Name of site, detailed directions, fee required if any, elevation, restrictions, descriptions of: horizon, sky darkness, physical environment, special needs (for example, bring own water? warm clothes?), access (car, jeep, walk in?), and useable season; and, if you can, a map or diagram. Any other comments will be welcome; also, multiple listings.

Woodruff Sullivan is right: the survival of our species depends on people being able to see themselves in a larger context; there is none larger than the universe. We may not now have a good view from our own back yards, but dark skies are not far away; the view of the Milky Way, from a meadow in a National Forest, becomes more precious when we have to go far to seek it. I hope we will soon have our night skies back where they belong — everywhere — but in the meantime, dark skies are not lost, as long as we know where to find them.

I wish you good seeing!

Linda Blanchard
8644 Brae Brooke Dr.
Lanham, Maryland 20801

The porous dam approach to life

Please consider the following comment on "Becoming Part of Gaia," Fall 1984.

Even before I bought my 48 acres, I began sneaking onto the property to

REBECCA WILSON

build checkdams in the erosion gullies. Like Paul Krapfel, I learned that a great dam is of no use in stopping water, as it pops out of the gully like a cork.

But you *can* put a big dam in a big gully if the dam is porous. To make a porous checkdam, I lay a large log across the top of the gully, braced against trees or stakes. I then stack smaller logs on the uphill side of the "dam beam" arranged like a comb in the gully. I then stack brush and leaves upstream from that. The floodwaters drop silt as they flow through this dam, completing the work of filling in the dam solid with no further effort. A four-foot-high dam, in three years, has silted up halfway, with one repair. All the dirt came from my neighbor's bean field; free land, as it were.

The lesson here is, we may completely stop a small amount of environmental damage by using a small, impenetrable dam. Later, we may hope to build another tiny dam on top of that one, and slowly work up to a large goal. A large impenetrable dam (for instance, legislation outlawing all fossil fuel-burning devices) opposes too much force, and will burst. (No one would obey such a law, not even a Thoreau or a John Muir). But a large porous dam will tend to finish its own work, accumulating silt by its very existence. The sheer economics of the energy crisis (the porous dam) has brought one-quarter of the homes in the U.S. to the point of willingly installing wood stoves (the first accumulation of silt). Now, woodsmoke is beginning to choke many suburban valleys, and wood is becoming scarce or high-priced. Therefore, many people are installing more efficient stoves or smoke-stopping catalytic converters. These measures result in less wood burned and less pollution at the same time. Another load of silt is dropped in the dam. Many finally get around to insulating their homes. Another deposit of silt. Our local nuke goes on line next year, which will cause 70 percent rate hikes. This will create another burst of conservation, another bushel of soil caught in the act of escaping to New Orleans.

We have created our present environmental situation slowly, under pressure from outside forces. Economics, ignorance, and custom forced the people who farmed my land a hundred years ago to grow continuous corn and plow straight downhill. The same force of economics forces me to save every bushel of soil that is left, and to improve what is there to work with. I see what will happen if I continue those same farm practices: my grandchildren will inherit a rockpile. Any change toward sustainability must be as incremental as the crisis was — these changes must be slow, porous, and influenced by pressure from the outside. Only a righteous person will abstain in the midst of plenty, even the most unfeeling will abstain when times are hard. Like the porous checkdam, Ecotopia can only accumulate deposits of support through evolution, not revolution.

Sustainably yours,
Lawrence Lile
Bunceton, Missouri

Glibness nailed

. . . This is a comment on Stewart's glib reply to the first letter in #43's Backscatter: "The religion you're looking for is quite popular, quite prosperous, and still growing fast. Science."

What unmitigated bull! Maybe you're in a rut, and instead of reincarnating the not-even-dead **CQ** you should go live in a hut in the Big Horns for a few years and swear off the printed word. These cute, cryptic, pithy, pseudo-profound reviews and replies sound like you've been doing this for so long your pen is on automatic pilot, ready to give a too-clever-by-half reply to almost anything.

Ben Mates wants a religion that welcomes doubt and skepticism. Science is supposedly built on doubt and skepticism. Voila, an answer! It's like offering a man who needs a bicycle with a headlight a room with a floor lamp. Well, they both have lights, don't they?

How can the man whose "godfather of most of what I've been up to with **CQ**" is Gregory Bateson (#35, p. 34) offer science as religion? Look at the letters-from-Gregory in #36. Gregory models religion as a balancing force *correcting* the destructive tendencies of unaided consciousness and its scientific and technological embodiments. Whatever good things Ben may have found while exploring religions, my guess is that he would find few or none of them associated in any way with science. . . .

Janie Matrisciano
Shorewood, Wisconsin

Pseudo-profound reply:
I didn't say science was a good religion.
—Stewart Brand

Gossip

STEWART BRAND: *Sometimes "Gossip" is about business matters behind and around the magazine, too often maybe. Preferably it's about the people whose working lives make the magazine, like walking around the back of a Balinese shadow puppet play and watching the gamelan musicians eat while playing and the puppeteer slapping the vividly painted (for who?) puppets against the shadow screen. The Balinese invite audience backstage; so do we.*

The theme this time seems to be: strenuous summers.

Joe Kane ("Whole Earth Review" newspaper column editor and occasional magazine copy editor) got high-lowed by a couple of burly Samoans in a North Bay League soccer game and blew out his knee — torn ligaments. Meanwhile two of his freelance articles hit print — "Klepinger's Escape" (about a professional mountain guide in Nepal) in the October ***Esquire*** *and an article on Friend of the Earth Dave Brower in the December* ***Outside****.*

David Burnor (library, review books, subscriptions) spent his 35th birthday underwater in Carmel Bay trying out his brand new scuba certification. The Pacific Ocean made him the gift of somebody's nice plastic-clad weight belt, dramatically tangled in kelp.

In other ocean news, I tried to graduate from boogie board to proper surfboard — from able-to-keep-up-with-the-13-year-olds on the styrofoam lie-down boogie board to total embarrassing klutz on $20 surfboard. A ranger friend at the beach noted that I'm easy to spot in the line-up. Not that many bald-headed surfers.

Elsewhere in the Pacific James Donnelly (typesetting, pasteup, cartoons) went salmon fishing with his mother. The 16-pounder she caught they took all bloody and dead to a Fisherman's Wharf restaurant and scared the tourists. James refrigerated the fish but never got to eat it; a German punk rocker got to it first.

The other typesetter, Marli Krushkhova, spent her summer vacation in the area around Baltimore, Maryland, which she found to be exotic, even tropical, in August.

Cliff Figallo (computer research) took acid — LSD — for the first time in 15 years. "It still works." Overlooking the beach at Point Reyes National Seashore, this former member of Stephen Gaskin's Farm in Tennessee discovered that, "It's still possible to have a spiritual experience, even after 15 years in a spiritual community." Something his computer hasn't done for him, or any of us.

Kathleen O'Neill (design, pasteup) and Don Ryan (camera, pasteup) did some outside collaborating. During a Whole Earth production break they beautified former editor Anne Herbert's book, ***Random Kindness and Senseless Acts of Beauty****, coming soon from Random House, and also helped teach a "Design for Newspapers" seminar at Sonoma State College.*

DICK FUGETT

Overcast skies and a dirt road with two feet to spare on each side — Coyote Valley International.

Susan Ryan, Andrea Sharp, Ted Schultz, and Hank Roberts are also working on the ***Random Kindness*** *book.*

Intrepid traveler of the season is Dick Fugett (general purpose clerk), who was flying a small plane to New Mexico to meditate in the mountains at the Lama spiritual retreat when weather forced him down. Alone in the Cessna, he landed on a sagebrushy hillside of a wilderness high mountain valley. The altimeter read 6500 feet. He checked the manual and confirmed that the mile-plus-high, thin air was going to have severe effects on his ability to take off again — radically less lift and less power. He spent the night with howling coyotes. In the morning the general purpose clerk taxied to a primitive winding muddy road in the middle of the valley, howled down it 3,000 feet to its end, and just barely lifted off, the sagebrush whisking the mud off his wheels.

Whole Earth Review Update

We apologize for neglecting to mention that "Endangered Night Skies" by Woodruff Sullivan (Fall '84 ***CQ****) first appeared in a similar form in the May 1983 issue of* ***Sky and Telescope*** *($18/yr., 49 Bay State Road, Cambridge, MA 02238), and was reprinted with permission. Likewise, "Indigenous Theater" by Maryat Lee (Fall '84* ***CQ****) originally was published in* ***Drama Review****, Winter 1983, under the title of " . . . To Will One Thing."*

PharmChem (reviewed in ***NWEC****, p. 579) no longer does anonymous drug analysis for individuals. That leaves one lab in Miami, also reviewed on page 579, still in business. The method is the same — a qualitative (but not quantitative) analysis by a computerized gas chromatograph-mass spectrometer capable of identifying 25,000 different drugs. This means that if a cocaine sample is cut with benzocaine and caffeine, the test will say so but won't say how much. (Bulking additives for cocaine like mannitol or other milk sugars are not drugs and will not be identified.) Incidental news from the street: cocaine quality is up, quaaludes, including ones advertised as being from foreign countries, only rarely contain any methaqualone, and there is an angel dust epidemic in Washington, D.C., with current abuse exceeding that for heroin.*

Two addresses here: information or subscriptions to ***Street Pharmacologist*** *($20/yr for 12 issues) from: Up Front, P.O. Box 330589, Coconut Grove, FL 33233 (305/446-3585). Drug samples for analysis go to SP Labs, 5426 Northwest 79th Ave., Miami, FL 33166. Send $15/sample and enclose a random five-digit number. Give them ten days, call them up Mon.–Fri. 9–5 (EST), tell them your five-digit number and they read you the analysis.*

Two address changes from the seed catalogs listed on ***NWEC*** *pp. 100–101. Vita Green Farms is now at 217 Escondido Ave., Vista, CA 92083; and Larner Seeds is at P.O. Box 60143, 445 Monroe Dr., Palo Alto, CA 94306.* ***Studio Potter*** *magazine (****NWEC****, p. 257) has a new price and address: $12/yr. from P.O. Box 65, Goffstown, NH 03045. Similar changes for the* ***Review of International Broadcasting*** *(****NWEC****, p. 524): it is now $18/yr. for 12 issues from P.O. Box 490756, Ft. Lauderdale, FL 33349.*

Changes from recent issues of ***CoEvolution Quarterly*** *begin with the Summer '84 issue and the religious newsletter* ***Body & Soul*** *(p. 67). The price is now $16/yr. for 10 issues, and there is a new address: Resource Publications, Inc., 160 E. Virginia St., Suite 290, San Jose, CA 95112. The makers of the Prisma Field Notebooks (p. 77) have moved, and offer their notebook cases now in just two colors — navy blue and burgundy —*

Prisma Outdoor Products, P.O. Box 3462, Boulder, CO 80307.

We listed a wrong subscription price in the review of ***Alternative Sources of Energy*** *magazine (p. 79). The correct price is $25/yr. for 6 issues. And the magazine* ***Exquisite Corpse*** *(p. 126) has a new address: P.O. Box 20889, Baltimore, MD 21209.*

The catalog from the Pony Express Book Service, a mail-order source of children's books we reviewed on p. 103 of the Winter '83 **CQ**, *has gone up a buck and is now $2 from Rt. 1, Box 10, Safford, AZ 85546.*

The self-published book ***You're Gon'na Love It!*** *reviewed in the Fall, '83* **CQ** *on p. 127 was a source of irritation to readers who ordered it and waited and waited for the book. Author/publisher Chuck Lewis wrote to apologize and say that all orders are filled and that he is able to handle new orders on a two-day turnaround. Ten Speed Press is also going to begin publishing the book, which means it will be available in bookstores next year.*

The monthly ***International Employment Hotline*** *that was reviewed on p. 113 of the Spring '83* **CQ** *has a new address: P.O. Box 6170, McLean, VA 22106.*

In the Unclassified section for issue #43 under "Unique Business For Sale," the word "part-time" was left out. The sentence should have read: "This provides two or three substantial ***part-time*** *incomes."*

And finally, the Incense Works mail-order catalog of fine smelling things from p. 75 of the Spring '82 **CQ** *has a new price and address: $1 from P.O. Box 427, Kula, HI 96790.*

—Richard Nilsen

Unclassifieds

Thank you for all your past Unclassifieds. We have enjoyed working with them and with you.

Due to space limitations we will no longer be running them.

Susan Erkel Ryan

"Or Whole Earth Access"

That phrase under access information in the **Whole Earth Review** means you can mail order the item from the Whole Earth Access store, operated by Basic Living Products. *Do not sent orders for books reviewed in* **WER** *or the* **Whole Earth Catalog** *to* **Whole Earth Review**.

Send your mail order book orders to:

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2990 Seventh Street
Berkeley, CA 94710

All orders: Add $1 for one book; $1.50 for 2-4 books; $2 for 5 or more books.

Rush orders U.P.S. (Continental U.S.): 40 cents additional charge per book.

Foreign orders: (surface mail) 50 cents additional postage per book past the first two. International Registry Insurance (add $3.50 per order) is recommended. Payment only in U.S. funds drawn on a U.S. bank.

California delivery: Add 6% tax (BART counties 6½%).

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That phrase means you can order these items from Computer Literacy, a bookstore specializing in computer related books.
Send orders to:

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Mailing Services: *American Press, Columbia, Missouri; Publishers Aide, San Diego, California*
Mailing List Brokers: *Pacific Lists, Mill Valley, California; Triplex Direct Marketing Corporation, San Rafael, California (fulfillment)*
Stats and Halftones: *Marinstat, Mill Valley, California*
Printing: *Progressive Graphics, Oregon, Illinois (film work); American Press, Columbia, Missouri*

WHOLE EARTH Review

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CoEvolution Quarterly
June, July, August 1984*

Income	
Subscriptions & Renewals	65,383
Newsstand Distribution	22,978
Back Issues	1,155
Mailing List	3,948
Unclassified Ads	1,016
Contributions	1,172
Miscellaneous	371
Total Income	**96,023**
Expenses	
Point Corporate	18,333
Freight (Distribution)	1,276
Printing (Magazine)	27,990
Mailing List	1,464
Subscription Promotion and Fulfillment	19,827
Writers & Contributors	6,410
Salary — Editorial	15,278
Salary — Research	1,795
Salary — Production	18,515
Salary — Office	1,658
Salary — Circulation	5,001
Equipment Rent/Lease/ Maintenance	2,989
Supplies (Office, Production, Computer)	3,802
Postage	648
Rent & Bldg. Maintenance	4,657
Telephone	1,883
Utilities	264
Miscellaneous Operating Expenses	4,027
Total Expenses	**135,817**
Profit/Loss	**- 39,794**

* These figures overlap one month with last issue's report, but cover a whole quarterly cycle for **CQ**. Next time we will go to the bimonthly format and be reporting on the previous issue each time.

Point Project Reports:
June, July, August 1984*

Whole Earth Software Catalog & Review

Income	
Software Review Subscriptions	38,078
National Newsstand	0
Direct Distribution	6,310
Doubleday — 2nd part of advance	552,500
Doubleday — Catalog production expenses	43,100
Miscellaneous	5,747
Total Income	645,735
Total Expense	345,431
Profit/Loss	300,304

Uncommon Courtesy

Income	0
Expense	190
Profit/Loss	-190

Chronicle Column/Royalties

Income	11,010
Expense	5,373
Profit/Loss	5,637

Other Products

Income	4,197
Expense	11
Profit/Loss	4,186

* This also overlaps by a month with last issue's report. Next time the format will appear as a consolidated report since we are now one publication.

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STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
(Required by 39 U.S.C. 3685)

1A. TITLE OF PUBLICATION	1B. PUBLICATION NO.	2. DATE OF FILING
CoEvolution Quarterly	0199-1150	9/28/84
3. FREQUENCY OF ISSUE	3A. NO. OF ISSUES PUBLISHED ANNUALLY	3B. ANNUAL SUBSCRIPTION PRICE
Quarterly	4	$18.00

4. COMPLETE MAILING ADDRESS OF KNOWN OFFICE OF PUBLICATION (Street, City, County, State and ZIP+4 Code) (Not printers)
27 Gate 5 Road, Sausalito, Marin, CA 94965

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Stewart Brand 27 Gate 5 Rd. Sausalito, CA 94965

EDITOR (Name and Complete Mailing Address)
Kevin Kelly 27 Gate 5 Rd. Sausalito, CA 94965

MANAGING EDITOR (Name and Complete Mailing Address)
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10. EXTENT AND NATURE OF CIRCULATION	AVERAGE NO. COPIES EACH ISSUE DURING PRECEDING 12 MONTHS	ACTUAL NO. COPIES OF SINGLE ISSUE PUBLISHED NEAREST TO FILING DATE
A. TOTAL NO. COPIES (Net Press Run)	36,633	36,300
B. PAID AND/OR REQUESTED CIRCULATION 1. Sales through dealers and carriers, street vendors and counter sales	11,547	11,277
2. Mail Subscription (Paid and/or requested)	20,611	19,738
C. TOTAL PAID AND/OR REQUESTED CIRCULATION (Sum of 10B1 and 10B2)	32,158	31,015
D. FREE DISTRIBUTION BY MAIL, CARRIER OR OTHER MEANS SAMPLES, COMPLIMENTARY, AND OTHER FREE COPIES	225	223
E. TOTAL DISTRIBUTION (Sum of C and D)	32,383	31,240
F. COPIES NOT DISTRIBUTED 1. Office use, left over, unaccounted, spoiled after printing	3,414	5,060
2. Return from News Agents	836	0 (REVISED)
G. TOTAL (Sum of E, F1 and 2 - should equal net press run shown in A)	36,633	36,300

11. I certify that the statements made by me above are correct and complete
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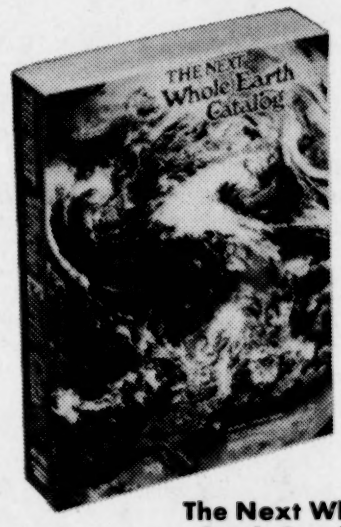
OTHER PRODUCTS

Whole Earth Access Company, in Berkeley, not only handles the mail order fulfillment of books reviewed in *WER*, but also handles the "other products" that we used to sell; yes, even *CQ* T-shirts.

CoEvolution T-shirt
$8 XS (youth's 14-16), S (34-36), M (38-40), L (42-44), XL (46-48)

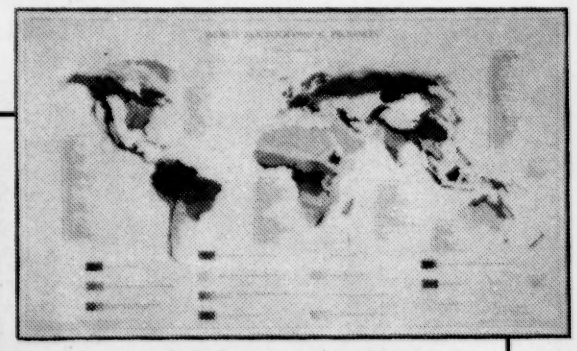
Bluegenes T-shirt
$10 S (34-36), M (38-40), L (42-44), XL (46-48)

CoEvolution Sweatshirt
$16 S (34-36), M (38-40), L (42-44), XL (46-48)
SOLD OUT



The Next Whole Earth Catalog
2d Edition (1981)
$16

CoEvolution Quarterly Back Issues
$3.50 Each
$10 for 4
Issues 14-26, 28-41



World Biogeographical Provinces Map
$4
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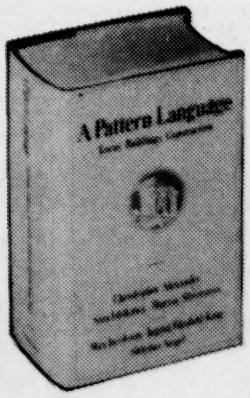
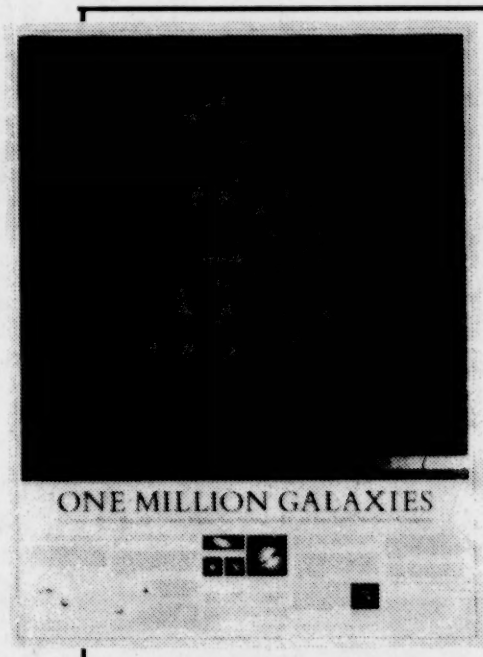
Paul Hawken's
The Next Economy
$14.50



A Pattern Language
(Towns, Buildings, Construction)
$45



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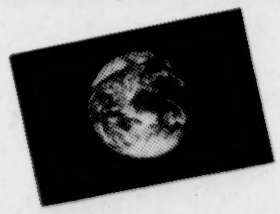

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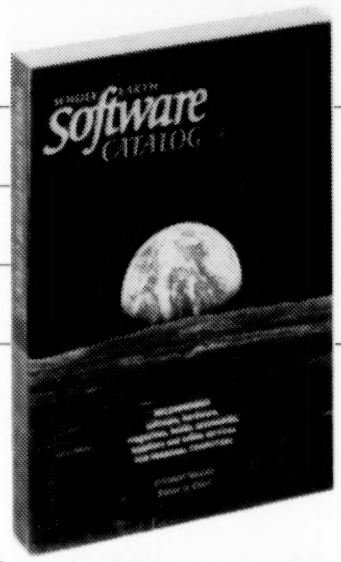
WHOLE EARTH SOFTWARE CATALOG



Whole Earth Software Catalog
Special Deal
$15 postpaid
(costs $17.50 in retail stores)

The Whole Earth Software Catalog *is 208 pages, 32 of them color, covering "recommended software, hardware, magazines, books, accessories, suppliers, and online services for personal computers" — 450 items reviewed. The publisher is Doubleday; first printing is 200,000 copies, now in second printing.*

For the new computer user these days the most daunting task is not learning how to use the machine but shopping. Hence this book.

—Stewart Brand, Editor in Chief

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—Peter McWilliams, author of ***The Personal Computer Book,*** *syndicated column*

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—Christopher Lehmann-Haupt, ***The New York Times***

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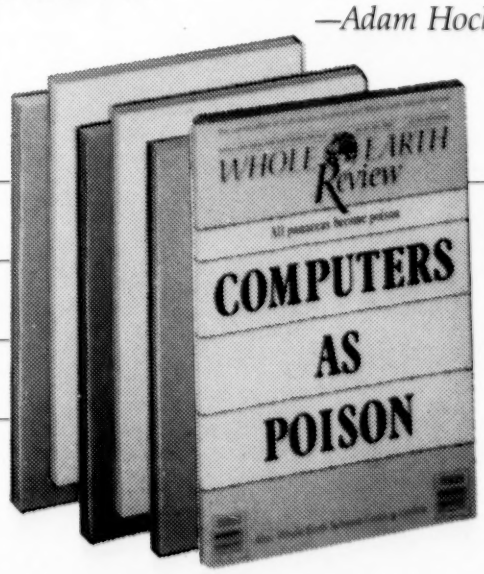
—Adam Hochschild, ***Mother Jones***

WHOLE EARTH REVIEW



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The magazine you hold in your hands; bimonthly (6 issues/year), 104 pages each issue. Subtitled "Tools and Ideas for the Computer Age," it is the continuation of *CoEvolution Quarterly* with computer stuff added keeping the *Whole Earth Software Catalog* up to date through 1985.

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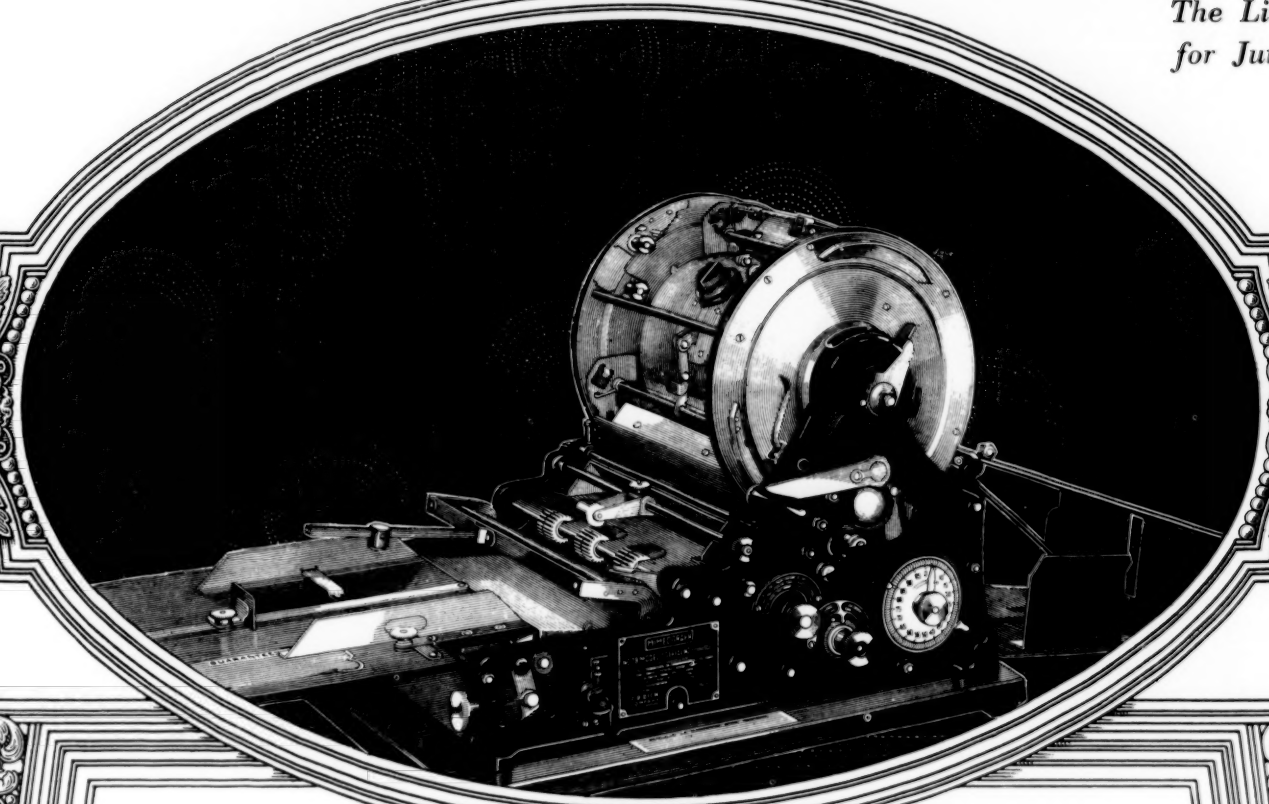

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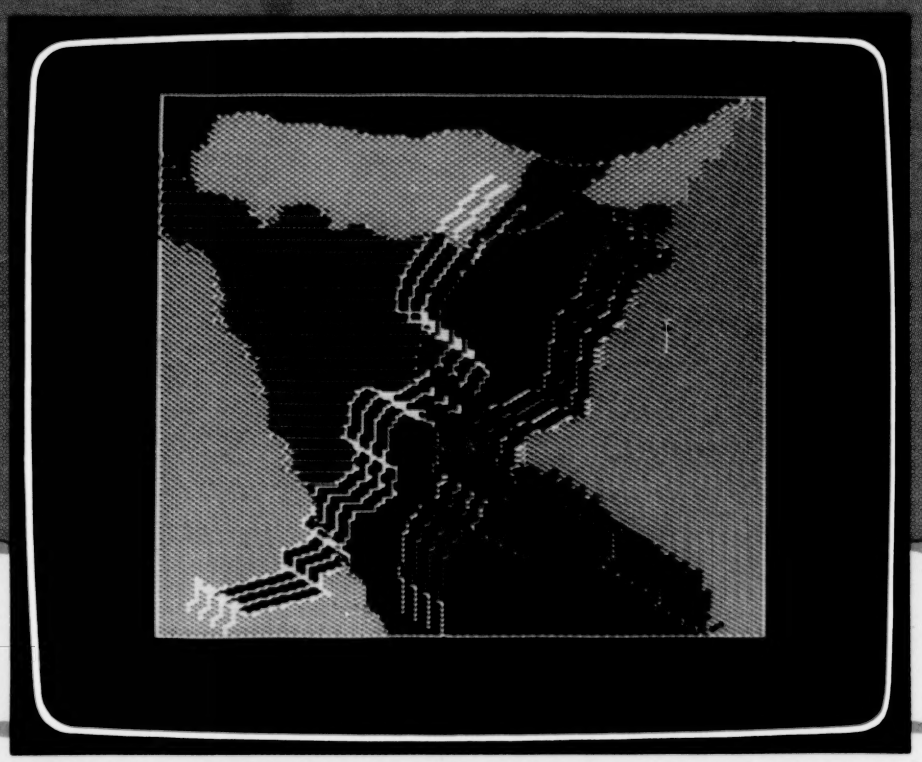
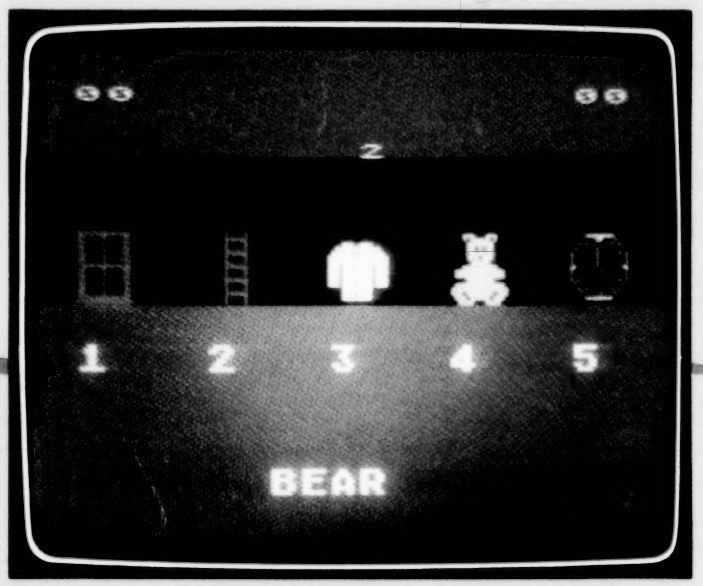
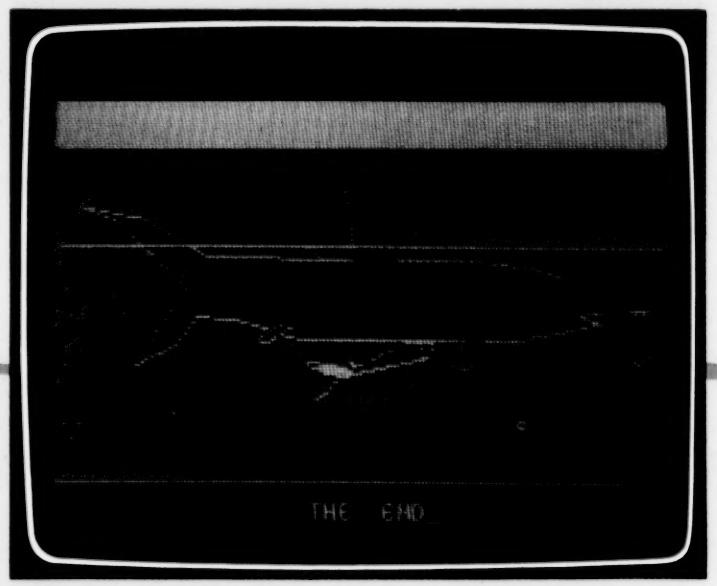


You design images on the screen, choosing from DIGITAL PAINTBRUSH's assortment of colors, textures, and brush patterns. A brush pattern helped create those ribbons of light-and-dark parallel lines. DIGITAL PAINTBRUSH's unique electronic pen and tablet helped place them more deliberately than most paint programs can handle (p. 91).

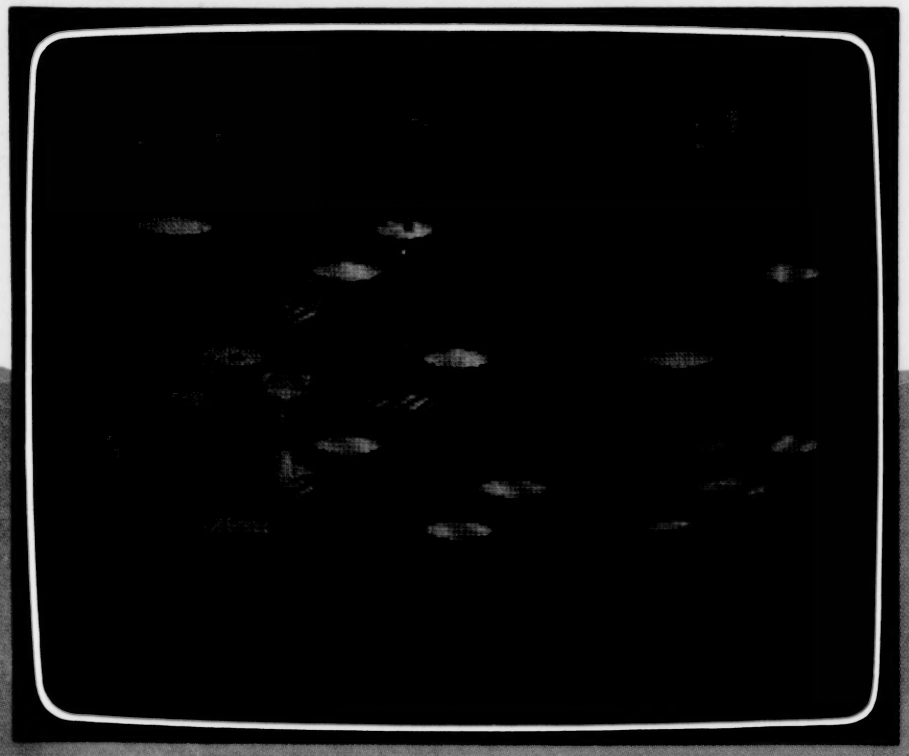
Computers as Tools



For young kids, hunt-and-peck typing is a great first step in learning to write. KIDS ON KEYS also teaches word recognition in games like this, which asks the child to match pictures with words (p. 95).



This shark is the conclusion of a fishy tale by a young storyteller. As he developed his plot he alternated illustrating and writing. He did both in the same program, STORY MAKER. Each type of play encourages the other (p. 96).



Four of the programs recommended in the Whole Earth Software Catalog update, starting page 74.

Demonically inventive POGO JOE pits your bouncing alter-ego Joe (in foreground) against a gaggle of dangerous and irritating creatures. Joe's mission: to hop onto every colored pylon, whereupon the program will switch to another, tougher pattern. Those black-topped pylons catapult Joe across the screen; the green-topped pylons eradicate all creatures but Joe (p. 80).